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# TRANSCRIPT OF RECORD

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Supreme Court of the United States

OCTOBER TERM, 1941/1942

No. 1029 45

SOLA ELECTRIC COMPANY, PETITIONER,

vs.

JEFFERSON ELECTRIC COMPANY

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT  
OF APPEALS FOR THE SEVENTH CIRCUIT

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PETITION FOR CERTIORARI FILED MARCH 9, 1942.

CERTIORARI GRANTED APRIL 6, 1942.



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JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., APRIL 23, 1942





[fol. 1]

[Placita omitted]

[fol. 2]

**IN DISTRICT COURT OF THE UNITED STATES,  
NORTHERN DISTRICT OF ILLINOIS, EASTERN  
DIVISION**

Civil Action No. 1716

**JEFFERSON ELECTRIC COMPANY, a Corporation,**

**VS.**

**SOLA ELECTRIC COMPANY, a Corporation**

**COMPLAINT—Filed May 27, 1940**

**(Equitable Relief Sought)**

To the Honorable Judges of the United States District Court of the Northern District of Illinois, Eastern Division:

Jefferson Electric Company, having its principal place of business in the Village of Bellwood, County of Cook, and State of Illinois, brings this its complaint against Sola Electric Company, having a place of business at Chicago, Illinois.

Plaintiff for its complaint alleges:

1. Plaintiff is a corporation of the State of Illinois, having a place of business at Bellwood, Cook County, Illinois, and defendant is a corporation of the State of Delaware and has its principal place of business at Chicago, Illinois, and is licensed under the laws of the State of Illinois to do business in the State of Illinois, and has appointed an agent in said state for accepting service on the defendant [fol. 3] corporation pursuant to the statutes of the State of Illinois.

2. The jurisdiction of this court arises by reason of the diversity of citizenship of the parties and by reason of the fact that the amount in controversy, exclusive of interest and costs, exceeds the sum of \$3,000.00.

3. Plaintiff is the owner of United States Letters Patent No. 1,777,256, granted to it September 30, 1930, for im-

provements in transformers, the application for said patent having been filed jointly by James C. Daley, Edward G. Goddard and Joseph G. Sola, on July 16, 1928, and assigned to plaintiff. Profert of said assignment is hereby made.

4. Plaintiff has granted licenses under said patent to several manufacturers, authorizing such licensees to manufacture and sell the patented transformers, included among which licensees is the defendant herein.

5. The license to defendant was granted under date of August 26, 1935; has not been cancelled by either party and inter alia requires the defendant licensee to mark all licensed transformers made by it in accordance with the statute by placing thereon the number of the above mentioned patent, to pay a royalty to the plaintiff based on the net invoice price of all licensed transformers manufactured and sold, to make reports at stated periods as to the number of licensed transformers so manufactured and sold, to select and register with plaintiff a trade-mark for the purpose of identifying the licensed transformers made by defendant, and to perform other lawful acts, all as will be apparent from the true copy of the license agreement which is attached hereto and marked "Exhibit A" for the purpose of identification.

6. The said license agreements above mentioned, including the said license to the defendant, are of great value to the plaintiff and have constituted and at present constitute a source of substantial income to the plaintiff, and plaintiff reasonably expects such license agreements to be a continued source of such income to it, provided the licensees, including the defendant herein, abide by the provisions of such license agreements.

7. Since the date of the license agreement, defendant, in ostensible compliance with the terms of the said agreement, has from time to time filed reports with plaintiff which purported to set forth the actual number of transformers manufactured and sold by it, has from time to [fol. 4] time paid certain sums on the transformers covered by the said reports, and has affixed the patent marking and the selected trade-mark to some of the licensed transformers sold by it, but the reports so filed were not accurate statements of the actual number of and amounts received for the licensed transformers made and sold by

defendant during the period covered by the reports, defendant has not paid all royalty due to plaintiff on the reported transformers, and large numbers of licensed transformers have been made and sold by defendant without any report having been made thereon to the plaintiff and without any royalty having been paid thereon to the plaintiff, as required by said license agreement.

8. Plaintiff is informed and believes and therefore avers that while ostensibly operating under said license agreement, defendant has manufactured and sold modified transformers upon which no royalties have been paid, that such modified transformers are in fact the equivalent of the patented transformers and fall within the provisions of said license agreement; or, in the alternative, plaintiff avers that defendant, while enjoying the advantages and privileges of said license, has wrongfully and deceitfully represented, directly or by implication, to customers, some of whom had previously purchased licensed transformers from defendant which bore the said identifying trade-mark of licensed transformers, that said modified transformers were licensed transformers, that defendant placed on such modified transformers the said trade-mark which identifies the licensed transformers of defendant and that defendant sold such modified transformers with the said trade-mark thereon as licensed transformers, and otherwise has constructed, packaged and, in general, dressed said modified transformers to resemble the transformers upon which royalties were paid, without, however, reporting said sales to plaintiff and without payment of royalties thereon, and has thereby unjustly profited and enriched itself and caused loss to the plaintiff.

9. Plaintiff has but recently discovered the above violations of the license agreement and the deceitful practices of defendant complained of, has protested several times to the defendant against the continuances of the same, but notwithstanding such protests the defendant has and now is persisting in the violation of said license agreement and in its deceptive and unjust practices, thereby causing [fol. 5] great loss to the plaintiff and jeopardizing its income from its other licensees.

10. Plaintiff further avers that Joseph G. Sola, one of the co-inventors of patent No. 1,777,256, on which the said

license agreement is based, and who joined in the assignment to plaintiff of the invention covered by said patent, is now and has been an officer of the defendant corporation, Sola Electric Company, and active in its management since prior to the date of said license agreement.

11. Plaintiff further alleges that said license agreement provides that plaintiff, or his duly authorized agent or attorney, shall have access to the books of the Sola Electric Company insofar as the same shall be pertinent to said license agreement, that plaintiff has demanded access to such books and has been accorded access only to certain of the pertinent records of defendant, and upon information and belief states that other books or records pertinent to the subject matter of this agreement are in existence, but plaintiff's duly authorized agent has been denied access to the same.

12. Plaintiff has in all respects performed all the covenants of said license agreement by it to be performed.

Wherefore, plaintiff prays:

(a) That an injunction, both temporary and perpetual, be issued out of this court, restraining the defendant, its agents, officers, employees, attorneys and others in active concert or in participation with the defendant, from manufacturing and selling licensed transformers without placing on such transformers a patent marking in accordance with the terms of the license agreement, and further enjoining the defendant from placing on transformers upon which royalties are not paid to plaintiff the same or substantially the same trade-mark as, or any trade-mark confusingly similar to, the trade-mark that defendant applies and has applied to the licensed transformers upon which defendant has paid royalties, and from simulating the appearance, dress and packaging of said licensed transformers and from in any manner violating the said license agreement now in force and effect between the parties hereto;

(b) For an order requiring the defendant to pay to the plaintiff the royalties provided for in said license agreement on all transformers manufactured by defendant bearing the selected trade-mark and upon which royalties have not been paid;



[fol. 6] (c) For an accounting of the royalties due to plaintiff under the terms of said license agreement, and for interest upon the sum found to be due;

(d) For damages and for interest thereon;

(e) For costs;

(f) For such other and further relief as this court may deem proper.

Jefferson Electric Company, by James C. Daley.  
Sheridan, Davis & Cargill, Counsel and Solicitors  
for Plaintiff. Thos. H. Sheridan, F. Thrall Brewer,  
Of Counsel, 135 South La Salle Street, Chicago,  
Illinois.

*Duly sworn to by James C. Daley. Jurat omitted in printing.*

## EXHIBIT "A" TO COMPLAINT

### License Agreement

This Agreement, executed in duplicate, this 26th day of August, 1935, by and between Jefferson Electric Company, a corporation of Illinois, (hereinafter called Jefferson Company), having an office and place of business at Bellwood, Illinois, party of the first part, and Sola Electric [fol. 7] Company, a corporation of Delaware (hereinafter called Sola Company), having an office and place of business at Chicago, Illinois, party of the second part Witnesseth:

Whereas, Jefferson Company is the owner of the entire right, title and interest in and to letters patent of the United States No. 1,777,256, issued September 30, 1930, and No. 1,786,422, issued December 30, 1930, for improvements in transformer construction;

Whereas, Sola Company desires to acquire a non-exclusive license to make, use and sell transformers embodying said inventions throughout the United States of America, its territories, dependencies, and possessions;

Now, Therefore, Be It Known That for and in consideration of the sum of One Dollar (\$1.00) paid by said Sola Company to said Jefferson Company, the receipt of which is hereby acknowledged, and in further consideration of

the premises and covenants of this agreement, the parties have agreed as follows, to-wit:

(1) Jefferson Company hereby grants unto the Sola Company a non-exclusive right and license to make, use and sell throughout the United States of America, its territories, dependencies, and possessions, transformers embodying the inventions described and claimed in said Letters Patent and any reissues and extensions thereof, throughout the entire term or terms of said Letters Patent granted or to be granted, unless this agreement should be previously cancelled as hereinafter set forth.

(2) Sola Company agrees to pay Jefferson Company, as royalties or license fees, three per cent (3%) of its net invoice price of transformers embodying the invention or inventions covered by either or both of said patents until the total royalties so paid equal Twenty-Five Thousand Dollars (\$25,000.00); then two per cent (2%) of said net invoice price until Twenty-Five Thousand Dollars (\$25,000.00) additional royalties have been paid; and one per cent (1%) of said net invoice price thereafter. Under this agreement transformers shall be considered to be sold when billed out, or if not billed out, then when delivered, or when paid for, if paid for before delivery; but royalties paid on transformers which are not accepted by the customer shall be credited against further royalty payments to be made hereunder.

(3) On or before the first days of February, May, August and November of each year, the Sola Company shall render a report to Jefferson Company showing the number [fol. 8] of transformers, embodying the inventions covered by the Letters Patent forming the subject matter of this agreement sold by Sola Company during the preceding quarter or three (3) months period, ending respectively on the last days of December, March, June and September of each year, and the amounts received therefor; and with each of said reports Sola Company shall make payment to Jefferson Company of the royalties which shall be due and payable in accordance with the provisions of Paragraph 2 hereof.

(3a) At reasonably frequent times and during usual business hours Jefferson Company or its duly authorized agent or attorney shall have access to the books of said



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Sola Company insofar as the same shall be pertinent to the subject-matter of this agreement, and the Sola Company shall have the right to have a representative present when any examination of the books of the Sola Company shall be made.

(4) Sola Company agrees to mark all transformers which it shall manufacture and sell in the United States, its territories, dependencies, and possessions, and which embody the inventions constituting the subject-matter of this agreement, or any of them, with the word "Patented" or an abbreviation thereof, such as "Pat.", together with the numbers of Letters Patent for the invention or inventions embodied in said transformer, and further agrees to mark on each of said transformers the trade-mark, or other symbol, word, figure or mark (which shall be registered with Jefferson Company) identifying the device as having been manufactured by Sola Company. Jefferson Company will, and its future agreements with other licensees shall provide that they conform to this same practice. Information as to such similar markings used by Jefferson Company or any of its other licensees shall be available to Sola Company when requested from Jefferson Company.

(5) Jefferson Company grants this license on the express condition that the prices, terms, and conditions of sale, for use or sale in the United States of America, its territories, dependencies and possessions, of transformers embodying any invention covered in the said patents, and so long as such devices continue to be covered by said patents, shall be no more favorable to the customer than those which from time to time the Jefferson Company establishes and maintains for its own sales and/or that of its other licensees of similar or competing transformers under such patents, [fol. 9] to such or other similarly situated customer purchasing in like quantities. The Sola Company shall be notified of all such prices, terms, and conditions of sale fixed by the Jefferson Company.

(5a) Subject to the provisions of the preceding paragraph, the prices, terms, and conditions of sale of Jefferson Company may be changed by the Jefferson Company from time to time provided at least sixty (60) days notice be given to Sola Company, prior to the effective date of such changes.

(6) It is agreed that it shall be regarded as a breach of this agreement for either party hereto to reduce the Jefferson Company's sale price or alter the Jefferson Company's selling terms and conditions of sale, directly or indirectly, either through its own organization, its agents, or others, by any device, subterfuge or evasion, or by any means whatever, or to make the price lower or the terms or conditions more favorable than those set forth by the Jefferson Company, except as above provided.

(7) In the event that either party hereto should fail to fulfill any of its covenants as set forth in this agreement, the other party hereto shall have the right to cancel this agreement, and the license granted herein, upon sixty (60) days written notice, unless such default shall be made good within thirty (30) days of the receipt of said notice.

(8) In the event of cancellation of this agreement said Sola Company shall have the right to fill all bona fide orders which it has on its books at the date when such cancellation becomes effective, and shall also have the right to sell all transformers embodying said inventions, or any of them, which shall be on hand or in process of manufacture at the time when such cancellation becomes effective.

9. It is understood and agreed that the license herein granted shall be personal to Sola Company, except that it shall be assignable by Sola Company in the event of a voluntary sale or assignment of the entire business of the Sola Company.

(10) The Jefferson Company agrees that it will bring and diligently prosecute such suits for infringement of the patents under which this license is granted as may reasonably be necessary for enforcing those patents and preventing unlicensed competition.

{col. 10} (11) Sola Company, at any time after one (1) year from the date hereof, on giving Jefferson Company thirty (30) days' notice in writing to that effect, may terminate this agreement.

(11a) On termination of this agreement, by cancellation or otherwise, the Sola Company shall be restored to all its rights and privileges the same as though this agreement had not been made; provided that such termination shall not affect any of the rights of the Jefferson Company to

proceed against Sola Company for the breach of any of the terms hereof, prior to such termination, nor shall any consent or acquiescence by Jefferson Company in any of the practices of Sola Company, either as to imitation of design or otherwise, in any way estop or be used against Jefferson Company in any action, proceeding, or complaint by Jefferson Company against Sola Company after such termination.

(11b) In the event that any of the claims of any Letters Patent under which a license is granted hereunder are held in any suit for infringement to be invalid or not infringed, or are awarded to another by a court of last resort or by a lower court or tribunal of competent jurisdiction from whose judgment no appeal is taken or certiorari granted within the period allowed therefor, then with respect to any claim so held to be not infringed the construction placed upon the claim by such court shall be followed with respect to acts occurring after the date of entry of the judgment or decree of such court or the issuance of the mandate, and with respect to any claims held invalid or awarded to another, the licensee shall be relieved from including in its reports hereunder transformers shipped, and acts performed, after the date of entry of the judgment or decree, or the issuance of the mandate of such court or tribunal, covered only by such claims, provided, however, that if there are two or more such final judgments, decrees, or mandates with respect to the same claim, the one more favorable to the claim shall be followed if, and so long as there is reasonable ground to believe that that judgment, decree, or mandate is correct.

(11c) If Jefferson Company at any time or times has granted or shall grant any other license under said patents, or either of them, containing terms more favorable to such other Licensee than to Sola Company, then Sola Company shall be entitled, as of the date of such other license, to substitute for this license a license having terms as favorable to Sola Company as those contained in such other license. Jefferson Company at all times shall keep Sola Company fully advised as to the granting of any and all licenses to others under said patents, or either of them, and the terms thereof, and without request shall promptly

furnish to Sola Company copies of all such licenses and any and all modifications or changes therein.

In Witness Whereof, each of the parties hereto has caused this instrument to be executed in duplicate by the signature and attestation of its proper officers, and the attachment of its corporate seal hereto, on the day and year first above written.

Jefferson Electric Company, By J. C. Daley, Vice-President. (Corporate Seal.)

Attest:

Lewis V. Jenkins, Secretary. Sola Electric Company,  
By A. R. Johnson, President. (Corporate Seal.)

Attest:

John R. Fisher, Secretary.

August 26, 1935.

Sola Electric Company, Chicago, Illinois.

GENTLEMEN:

Referring to the license agreement we have entered into with you of even date herewith; in order to make more definite a question of procedure under the agreement as drawn, it is understood that inasmuch as an outstanding license agreement with another licensee gives said other licensee thereunder the privilege of examining the books of the Jefferson Electric Company, the Sola Company, so long as such other licensee enjoys said privilege, shall have the right at reasonably frequent times and during usual business hours, by its duly authorized agent or attorney to have access to the books of the Jefferson Company [fols. 12-13] for the sole purpose of ascertaining whether or not the Jefferson Company has violated the provisions of paragraph 6 of its license agreement with the Sola Company by reducing or making more favorable to its own trade the sales prices, selling terms and/or conditions of sale established by it under its said license agreement with the Sola Company the Jefferson Company having the right to have a representative present when any examination of its books is made.

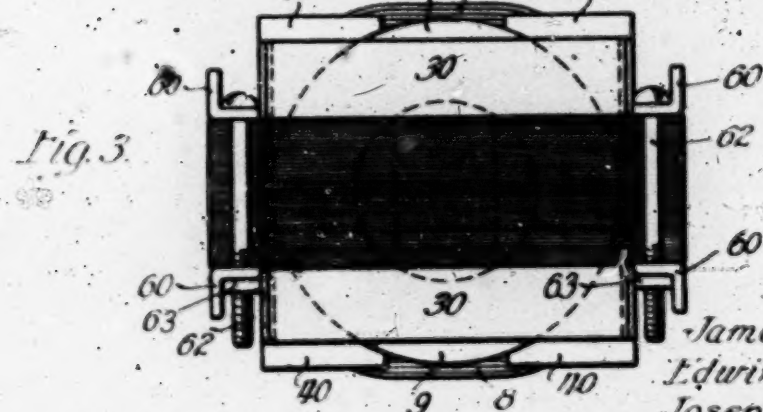
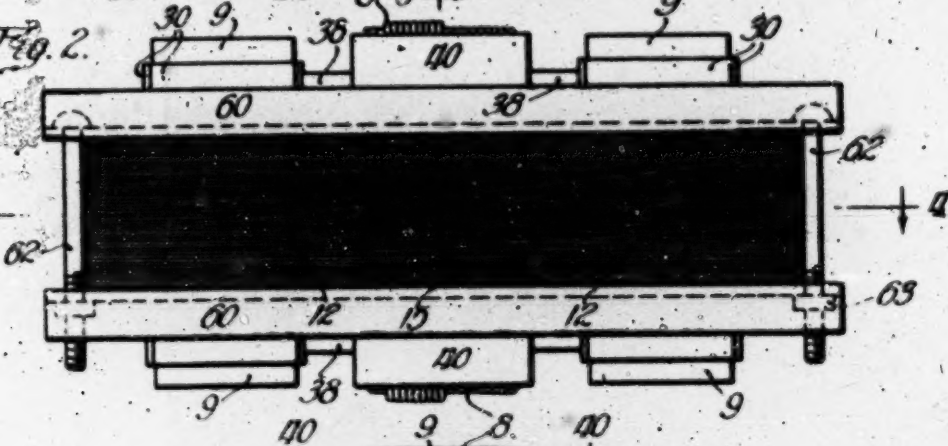
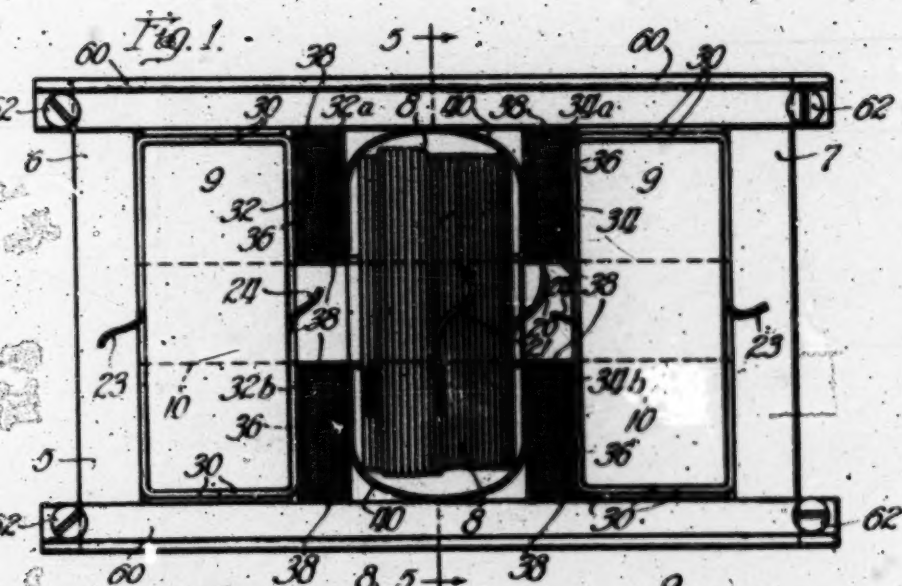
Yours very truly, Jefferson Electric Company, By  
J. C. Daley, Vice-President.

Accepted:

Sola Electric Company, By A. R. Johnson, President.







Inventor.  
 James C. Daley  
 Edwin G. Goddard  
 Joseph I. Sola  
*By* Brown, Jackson, Britcher & Quinn  
 Attys





Fig. 4.

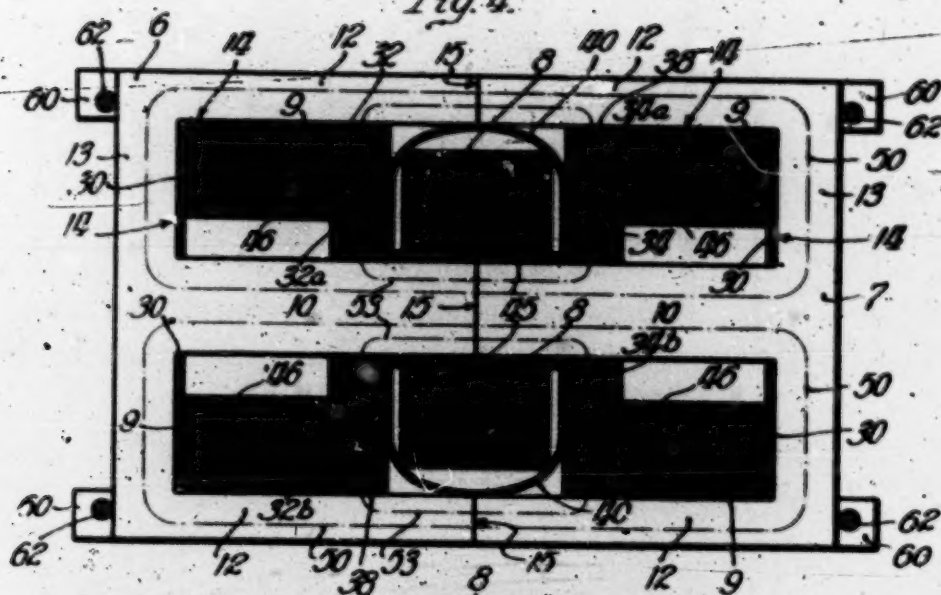


Fig. 5.

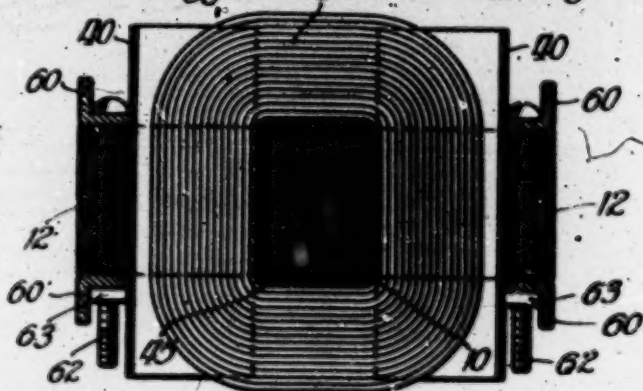
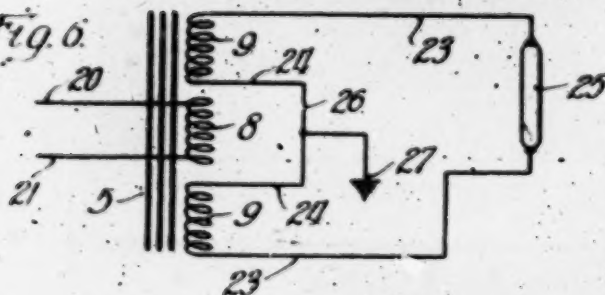


Fig. 6.



Inventors:  
James C. Daley  
Edwin G. Goddard  
Joseph J. Solg,  
By Brown, Jackson, Böttcher & Allen  
Attys.



Fig. 7.

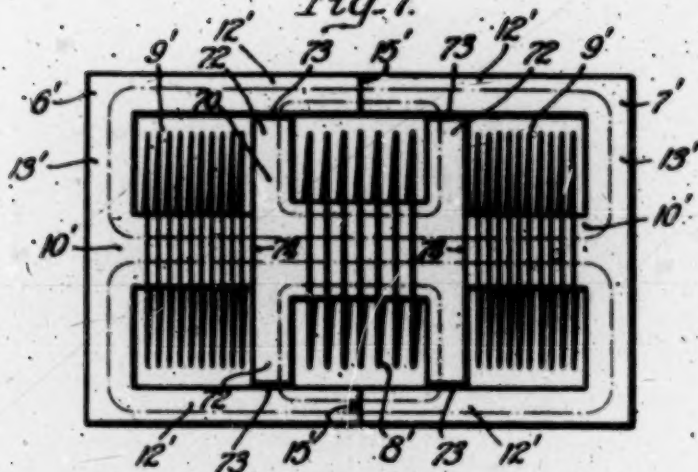


Fig. 8.



Fig. 9.



Inventors:  
James C. Daley  
Edwin G. Goddard  
Joseph J. Sofa  
By Brown, Jackson, Gottcher & Co. Attys



TRANSFORMER

Application filed July 16, 1923. Serial No. 233,233.

This invention relates to transformers and may be characterized as an improvement upon the transformer illustrated and described in the co-pending application of James C. Daley and Edwin G. Goddard filed November 11, 1927, Serial No. 232,523.

The present invention has particular utility in connection with gaseous tubes and the like which require relatively high initial or break-down voltages and a lower subsequent or normal operating voltage, but it is to be understood that the invention is not limited to a particular use or purpose, but may be employed for ignition purposes or wherever suitable or desired, as for example, wherever a relatively high initial voltage is desired, followed by a reduced or relatively low voltage for a decrease in load.

Although not limited thereto, the present invention in common with the invention of the co-pending application above referred to, relates particularly to a shell or confined type transformer in which there is practically no effect from adjacent magnetic materials and in which great compactness is permitted, particularly so far as the location or disposition of magnetic materials is concerned. Also in common with the co-pending application above referred to, the present invention provides for obtaining maximum brilliancy and uniform operation. Where thin sheet steel casings are employed, the device is substantially freed of changes thereby and any objectionable vibration and noises are practically eliminated. The rating and operation of the device is not affected by its disposition with respect to its steel housing or casing.

The present invention further provides a better distribution and a better balancing of the magnetic flux density, particularly in the secondary, and a better uniformity in the secondary output and, also, a generally improved and simplified construction that may be produced and assembled economically and expeditiously.

The invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a top plan view of a transformer embodying the present invention;

Fig. 2 is a side elevational view of the transformer shown in Fig. 1;

Fig. 3 is an end view;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a transverse section taken on the line 5—5 of Fig. 1;

Fig. 6 is a wiring diagram of the transformer illustrated in Figs. 1 to 5;

Fig. 7 is a more or less diagrammatic section similar to Fig. 4 of another embodiment of the invention;

Fig. 8 is a sectional view of another embodiment, taken on the line 8—8 of Fig. 9; and

Fig. 9 is a section taken on the line 9—9 of Fig. 8.

Referring to the drawings, each form of transformer shown is of the shell or confined type having a magnetic envelope which preferably completely surrounds and encloses the coils, and which also preferably encloses the shunt path or paths of the transformer as well.

In Figs. 1 to 5, the core 5 comprises two stacks 6 and 7 of iron or other suitable core laminations. The laminations 6 and 7 are for facility and convenience of similar configuration suitably shaped to form central legs or extensions around which the primary coil 8 and secondary coils 9, 9 are wound and outer legs which form a laminated iron ring or envelope surrounding or enclosing the coils 8 and 9.

While the particular shape or configuration of the laminations 6 and 7 may be varied, these laminations are preferably, and are shown as, of E-shaped form, each having a central or intermediate leg 10 and outer legs 12 extending from a connecting base 13 with coil or winding receiving spaces 14 formed between the central and outer legs of each stack of laminations, these spaces 14 opening from one end of each core stack and being closed at the other end by the base portion 13, which base portions 13, with the outer legs 12, complete the surrounding or confining magnetic envelope.

The transformer is assembled with the end of one core stack 6 from which the spaces



14 open, in opposition to the corresponding end of the other core stack 7 and preferably with the central and outer legs 10 and 12 in register and in abutting contact, as shown particularly in Fig. 4. A closed magnetic ring or envelope divided longitudinally by the central legs 10 is thus formed with butt joints 15 between the ends of the two laminated core stacks 6 and 7. Where we use the expression "butt joint" or "gap" between the stacks 6 and 7 of core laminations in this specification, or in the appended claims, either term is used in a broad sense and we intend that they be interchangeable. In the embodiment of Figs. 1 to 5, the central and outer legs 10 and 12 are of equal length, and the butt joints between the central and outer legs of the core stacks lie in a common transverse plane substantially centrally between the opposite ends of the transformer; although, of course, this may be varied.

The arrangement of the primary and secondary windings 8 and 9 is an important aspect of the present invention. The secondary winding comprises two sides or coils 9, 9 one wound about and encircling the bases of the central legs 10 of one core stack 6, and the other coil 9 being wound about and encircling the bases of the central legs 10 of the other core stack 7. The secondary coils 9, 9, the turns of which pass through the spaces 14 and between the central legs 10 and outer legs 12 of the core stacks, are spaced apart to receive the shunt means and the primary coil 8 which is preferably disposed substantially centrally between the secondary coils or coil sections 9, 9. The primary coil 8 is wound about and encircles the adjacent abutting ends of the central legs 10 of the core stacks 6 and 7 with the turns of the primary winding passing through the spaces 14 and between the abutting ends of the central legs 10 and the abutting ends of the outer confining legs 12.

It will now be apparent that each of the core stacks 6 and 7 has an outer secondary core part and that these stacks have meeting primary core parts which cooperate to form the primary core portion of the transformer. The disposition of the two secondary coils

advantages should it at any time become desirable to do so.

The primary winding 8 is shown as provided with a pair of terminal leads 20 and 21 for connection across or with the opposite sides of an alternating current or other suitable source of current supply (not shown). Although not shown, it is to be understood that the primary coil or winding 8 may be provided with intermediate leads or taps for connecting different voltages with the primary winding, depending upon the voltage required by the gaseous tube or other device connected across the terminals of the secondary coils. The particular manner of connecting the source of current supply across the primary winding and the number of leads or connections therefor may, of course, be varied widely within the scope of the present invention.

Each of the secondary coils 9, 9 is provided with a pair of terminal leads 23 and 24, respectively. The leads 23, 23 are connected across the gaseous tube or other device which is to be supplied from the secondary winding of the transformer. A gaseous tube 25 is shown, more or less diagrammatically in Fig. 6, as connected across the leads 23, 23. The terminal leads 24, 24 are preferably tied or connected together at 26 and the secondary winding is preferably grounded centrally between the coils 9, 9 by grounding the central connection 26 at 27. The ground connection 27 may be through the core or frame of the transformer, in which case the leads 24 may be tied or connected together and with the core or frame, or this ground connection may be made omitted, as desired.

It is to be understood that the turns of the primary and secondary windings are insulated from each other and from the magnetic core, as desired, and in any suitable or preferred manner, as well understood in the art. Each of the secondary coils are shown as enclosed in a generally rectangular open ended box-like insulating structure of "micanite" or other suitable insulating material. These structures, designated at 30, form intervening barriers between the secondary coils and the outer legs 12 of the core

The arrangement of the primary and secondary windings 8 and 9 is an important aspect of the present invention. The secondary winding comprises two sides or coils 9, 9 one wound about and encircling the bases of the central legs 10 of one core stack 6, and the other coil 9 being wound about and encircling the bases of the central legs 10 of the other core stack 7. The secondary coils 9, 9, the turns of which pass through the spaces 14 and between the central legs 10 and outer legs 12 of the core stacks, are spaced apart to receive the shunt means and the primary coil 8 which is preferably disposed substantially centrally between the secondary coils or coil sections 9, 9. The primary coil 8 is wound about and encircles the adjacent abutting ends of the central legs 10 of the core stacks 6 and 7 with the turns of the primary winding passing through the spaces 14 and between the abutting ends of the central legs 10 and the abutting ends of the outer confining legs 12.

It will now be apparent that each of the core stacks 6 and 7 has an outer secondary core part and that these stacks have meeting primary core parts which cooperate to form the primary core portion of the transformer. The disposition of the two secondary coils about the two sides of the primary coil 8 results in a balanced secondary winding the current flowing in any one coil of which does not under any short circuit or operating condition exceed the total current of the coils, i. e., the current in the complete secondary winding. The secondary winding cannot under any condition build up more current in one secondary coil than in the complete secondary winding. With the primary coil disposed between the secondary coils, all parts of the secondaries are more uniformly disposed with respect to the primary.

We reserve, of course, the right to correct or supplement the theory of action and ad-

vided with a pair of terminal leads 23 and 24, respectively. The leads 23, 23 are connected across the gaseous tube or other device which is to be supplied from the secondary winding of the transformer. A gaseous tube 25 is shown, more or less diagrammatically in Fig. 6, as connected across the leads 23, 23. The terminal leads 24, 24 are preferably tied or connected together at 26 and the secondary winding is preferably grounded centrally between the coils 9, 9 by grounding the central connection 26 at 27. The ground connection 27 may be through the core or frame of the transformer, in which case the leads 24 may be tied or connected together and with the core or frame, or this ground connection may be made omitted, as desired.

It is to be understood that the turns of the primary and secondary windings are insulated from each other and from the magnetic core, as desired, and in any suitable or preferred manner, as well understood in the art. Each of the secondary coils are shown as enclosed in a generally rectangular open ended box-like insulating structure of "micanite" or other suitable insulating material. These structures, designated at 30, form intervening barriers between the secondary coils and the outer legs 12 of the core stacks, as well as between the secondary coils and the bases 13 of the core stacks. These insulating structures 30 also form intervening insulating barriers between the secondary coils and the shunt means, to be hereinafter referred to.

The shunt means of the present device comprises a pair of shunts designated in their entirety at 32 and 34, respectively. Each shunt 32 and 34 preferably comprises a pair of shunt parts 32<sup>a</sup> and 32<sup>b</sup> and 34<sup>a</sup> and 34<sup>b</sup>, respectively. Each shunt part 32<sup>a</sup>, 32<sup>b</sup> and 34<sup>a</sup> and 34<sup>b</sup> preferably comprises a stack of soft iron or other suitable laminations disposed transversely with respect to the outer

legs 12 of the core stacks 6 and 7 and the laminations of each shunt stack may be suitably bound together as by means of rivets 36. The shunt parts 32<sup>a</sup> and 32<sup>b</sup> are disposed in alignment between the primary coil 8 and one of the secondary coils 9 and in the spaces between the central legs 10 and the outer legs 12 of one core stack, and the other shunt parts 34<sup>a</sup> and 34<sup>b</sup> are similarly disposed between the primary coil 8 and the other secondary coil 9 and between the central and outer legs of the other core stack.

The shunts 32 and 34 provide shunt paths between the outer legs 12 of the core stacks and the central leg 10 and these shunt paths 32 and 34 each preferably has an open circuit reluctance greater than the reluctance of the core proper and are adapted for shunting the primary flux through the primary part of the core when the reluctance of the secondary core or secondary core parts is increased by the energization of the secondary windings. Each of the shunt parts 32<sup>a</sup>, 32<sup>b</sup>, 34<sup>a</sup> and 34<sup>b</sup> is preferably gapped at its opposite ends from the central and outer legs 10 and 12 as by suitable insulating barriers 38. These insulating barriers which may be of red fiber or other suitable insulating material provide gaps or insulating barriers in each of the shunt stacks, it being understood that, although the particular arrangement shown and described in detail provides two gaps in each shunt stack or part, one gap, or any desired number of gaps, may be provided in each shunt stack, as suitable or preferred. The shunt stacks are insulated from the secondary coils 9 by the adjacent walls of the box-like insulating structures 30 and the primary coil 8 is also preferably enclosed in a suitable insulating structure 40. The particular insulating structure 40 shown comprises a pair of open ended generally arched or channel-shaped barrier separated by the central legs 10 with one substantially completely embracing each side of the primary coil and extending from the central leg on one side around the coil to the central leg on the other side.

central legs 10 form a common central flux path for both of the outer sides of the core, these central legs 10 are preferably of greater section than the outer legs 12. This greater section in the central legs may be obtained by making these legs wider and preferably substantially twice as wide as the outer legs 12 as shown, although this may be varied as desired. The relatively great initial intensity thereby produced in the secondary fields provides a high induced initial voltage in the secondary coils 9. This relatively high initial voltage in the secondary windings 9 is particularly desirable in the initial operation or breaking down of, or ionization of, the gases in a Neon or other gaseous tube.

As already pointed out, the shunt paths 32 and 34 each preferably has a reluctance higher than the reluctance of the secondary core portions so that upon initial energization of the primary winding, substantially the entire magnetic flux threads through the core proper to provide the high initial voltage in the secondary windings 9, as referred to, and then upon energization of the secondary coils or windings 9, the opposition set up increases the reluctance of the secondary core proper and thereafter the amount of flux required to saturate the secondary cores. Upon energization of the secondary windings 9 the increase in reluctance of the secondary core portions with the decrease in the amount of flux required to saturate the same causes the magnetic flux threading through the primary core portions to break down or overcome the reluctance of the shunt paths 32 and 34 and at least a part of the primary flux leaks through the shunt paths 32 and 34 and threads back through the primary core portion as indicated by the dot and dash lines 53, 53 in Fig. 4. As already pointed out, the flux threading through and intensity of the secondary field is thereby reduced with an accompanying reduction in the voltage in the secondary windings 9 below the relatively high initial voltage. This is particularly desirable in connection with gaseous tubes and the like where a relatively high initial



primary flux through the primary part of  
the core when the reluctance of the secondary  
core of secondary core parts is increased by  
the energization of the secondary windings.  
Each of the shunt parts 32<sup>a</sup>, 32<sup>b</sup>, 34<sup>a</sup> and 34<sup>b</sup> is  
preferably gapped at its opposite ends from  
the central and outer legs 10 and 12 as by  
suitable insulating barriers 38. These insu-  
lating barriers which may be of red fiber or  
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gaps or insulating barriers in each of the  
shunt stacks, it being understood that, al-  
though the particular arrangement shown  
and described in detail provides two gaps in  
each shunt stack or part, one gap, or any de-  
sired number of gaps, may be provided in  
each shunt stack, as suitable or preferred.  
The shunt stacks are insulated from the sec-  
ondary coils 9 by the adjacent walls of the  
box-like insulating structures 30 and the pri-  
mary coil 8 is also preferably enclosed in a  
suitable insulating structure 40. The particu-  
lar insulating structure 40 shown comprises  
a pair of open ended generally arched or  
channel-shaped barrier separated by the cen-  
tral legs 10 with one substantially completely  
embracing each side of the primary coil and  
extending from the central leg on one side  
around the coil to the central leg on the other  
side.

These insulating barriers 40 may also be  
of red fiber or other suitable insulating ma-  
terial and they insulate the primary coil from  
the shunt parts, as well as from the outer  
legs 12 of the core stacks. Internally, the  
primary and secondary coils may be suitably  
insulated at 45 and 46, respectively, from the  
central legs 10 of the core.

In operation, the alternating or other suit-  
able exciting current or current supply is  
applied across the terminals 20 and 21, for ex-  
ample, of the primary coil 8. Upon initial  
energization of the primary winding 8 sub-  
stantially the entire magnetic flux threads  
through the primary and secondary core  
parts, as indicated diagrammatically by the  
dot and dash lines 50 in Fig. 4. In that the

than the reluctance of the secondary core  
portions so that upon initial energization of  
the primary winding, substantially the en-  
tire magnetic flux threads through the core  
proper to provide the high initial voltage in  
the secondary windings 9, as referred to, and  
then upon energization of the secondary coils  
or windings 9, the opposition set up increases  
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gization of the secondary windings 9 the in-  
crease in reluctance of the secondary core  
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flux required to saturate the same causes the  
magnetic flux threading through the primary  
core portions to break down or overcome the  
reluctance of the shunt paths 32 and 34 and  
at least a part of the primary flux leaks  
through the shunt paths 32 and 34 and threads  
back through the primary core portion as in-  
dicated by the dot and dash lines 53, 53 in  
Fig. 4. As already pointed out, the flux  
threading through and intensity of the sec-  
ondary field is thereby reduced with an ac-  
companying reduction in the voltage in the  
secondary windings 9 below the relatively  
high initial voltage. This is particularly  
desirable in connection with gaseous tubes  
and the like where a relatively high initial  
voltage is required and where thereafter the  
voltage required to operate or maintain the  
tube lighted is less.

The device may be designed to proportion,  
as desired, the leakage back through the  
shunt paths with respect to the flux which  
threads through the secondary core portions,  
by means of which the voltage which follows  
the relatively high initial voltage may be re-  
duced as desired and effectively controlled.  
To this end the shunt stacks 32<sup>a</sup>, 32<sup>b</sup>, 34<sup>a</sup> and  
34<sup>b</sup> may be adjustably mounted between the  
legs 10 and 12 of the core, preferably as  
shown, by means of a pressed fit between said  
legs 10 and 12, although, of course, the par-  
ticular mounting and the particular manner  
of securing adjustability in these shunt paths

may be varied. The pressed fit of the shunt stacks between the core legs 10 and 12 enables conveniently adjusting the position of the stacks between these legs of the core, and this provides a convenient adjustment for adjusting and rating the device.

In the particular device illustrated, the core stacks 6 and 7 are of substantially the same cross section and the core laminations are standardized, that is, the same laminations are employed in both stacks and these laminations may be standardized with the core laminations of transformers of other types. It is to be understood that the core laminations may be of other configurations than shown and that the laminations of one stack may be of different configuration than the laminations of the other stacks. The cross section of the primary portion of the core may also be greater than the cross section of the secondary portions of the core for the purpose of decreasing the flux required to saturate the secondary core portions and for obtaining what appears to be the additional advantage of decreasing the amount of flux which is shunted through the shunt paths 32 and 34 upon energization of the secondary windings.

This will enable a reduction in the sections of the shunt paths which reduces the spaces between the primary and secondary windings and increases the space allowed for these windings in a device of given size. The size of the windings may thereby be increased in relation to the size of the device and the resulting device is exceedingly compact and the cost is low. Adjustability of the shunt stacks also makes the device particularly flexible for different types of devices and enables the use of the same core iron in different types of devices.

In the embodiment illustrated in Figs. 1 to 5, the laminations of the core stacks 6 and 7 are clamped together along each side by

With the magnetic envelope enclosing both the primary and secondary coils, as well as the internal shunts 32 and 34, there is practically no effect from adjacent magnetic materials.

This permits great compactness, so far as the location of magnetic materials is concerned, and it has been found that an exceedingly uniform operation is obtained. These advantages are particularly important in gaseous tube signs where the conflicting requirements of compactness and maximum brilliancy are imposed. The user of a gaseous tube sign desires uniform operation and if there are great losses in the steel casing, or adjacent or abutting magnetic material, this brilliancy will be objectionably reduced. With the present invention the steel casing produces practically no effect and uniform operation is obtained. In addition, it is unnecessary to make allowance for losses in the casing and other adjacent materials, and objectionable noises are eliminated.

In the embodiment of Fig. 7, the central legs 10' of the core stacks 6' and 7' are shortened and a stack of generally H-shaped laminations 70 are interposed between these shortened legs 10' with the legs 72 of the core stack 70 forming the shunt paths. Gapping barriers 73 are preferably interposed between the shunt legs 72 and the outer legs 12' of the core stack 7'. The butt joints 15' between the outer legs 12' are in a common transverse plane, as before, and the central legs 10' have butt engagement at 74 with the core stack 70, these butts 74 being out of the plane of the butt joints 15'. The primary coil is indicated at 8' in Fig. 7 and the secondary coils or coil parts are indicated at 9', 9'. The results produced with this form of the invention are substantially similar to those produced with the form shown in Figs. 1 to 5.

In the embodiment of the invention illus-

This will enable a reduction in the sections of the shunt paths which reduces the spaces between the primary and secondary windings and increases the space allowed for these windings in a device of given size. The size of the windings may thereby be increased in relation to the size of the device and the resulting device is exceedingly compact and the cost is low. Adjustability of the shunt stacks also makes the device particularly flexible for different types of devices and enables the use of the same core iron in different types of devices.

In the embodiment illustrated in Figs. 1 to 5, the laminations of the core stacks 6 and 7 are clamped together along each side between a pair of clamp bars or brackets 60. These bars or brackets 60 may be of angle iron formation, as shown, and their opposite ends project beyond the closed ends of the core stacks 6 and 7. These projecting ends of the bars or brackets 60 are provided with registering apertures through which extend clamping bolts 62, each provided with a head engageable with one bar or bracket 60 and having threaded engagement at its opposite end with a suitable nut 63 for drawing the bars 60 together and securely clamping the margins of the core stacks 6 and 7 therebetween. The transformer may be arranged in any suitable casing or housing, which has been omitted for the sake of clarity and it may be mounted upon metal brackets or adjacent external magnetic materials without being affected thereby and without any undesirable variation in the action or operation of the device.

stack 70 forming the shunt paths. Gapping barriers 73 are preferably interposed between the shunt legs 72 and the outer legs 12' of the core stacks 7. The butt joints 15' between the outer legs 12' are in a common transverse plane, as before, and the central legs 10' have butt engagement at 74 with the core stack 70, these butts 74 being out of the plane of the butt joints 15'. The primary coil is indicated at 8' in Fig. 7 and the secondary coils or coil parts are indicated at 9', 9'. The results produced with this form of the invention are substantially similar to those produced with the form shown in Figs. 1 to 5.

In the embodiment of the invention illustrated in Figs. 8 and 9, the core comprises a pair of five legged laminated stacks 80 and 82 assembled with the inner open ends of the legs in register and with the central and outer legs in butt contact and with the bases 83 and outer legs 84 forming the magnetic envelope enclosing and confining the coils and shunt paths. The primary coil 85 is shown wound around the central legs 86, but it is to be understood that the primary and secondary coils of this and the preceding embodiments may be reversed or interchanged, as desired, and the shunt legs 87 form the shunt paths. The central legs 86 are preferably of increased section, as shown, because of the threading of the magnetic flux from each side or each end therethrough, and the secondary coil indicated at 90 encircles or surrounds the primary coil 85 and is wound about the shunt legs 87 and through the spaces 92 between said legs 87 and the outer



legs 84. The butt joints between the central and outer legs of one core stack and the central and outer legs of the other core stack are indicated at 93 and the core stacks may be bound together in a suitable frame or otherwise, as desired. The opposing ends of the shunt legs 87 are suitably gapped as indicated at 93.

Upon the initial energization of the primary winding 85 of this embodiment, substantially the entire magnetic flux threads through the primary and secondary core portions as indicated by the dot and dash lines 95 in Fig. 8, and upon the increase in reluctance of the secondary core portions and the decrease in the amount of flux required to saturate the same upon energization of the secondary winding, the magnetic flux threading through the paths indicated diagrammatically at 95 breaks down or overcomes the reluctance of the shunt paths 87 and at least a part of the primary flux leaks through these shunt paths and threads back through the primary portion of the core as indicated at 96, 96 in Fig. 8. To these ends the shunt paths 87, 87 preferably have a reluctance higher than the reluctance of the secondary core portions.

We do not intend, of course, to be limited to the precise details or arrangements shown or described.

We claim:—

1. In a transformer having magnetic core means, the combination of a secondary comprising a pair of secondary coils, a primary coil disposed between said secondary coils and inducing a relatively high voltage therein, and shunt means between the primary coil and the secondary coils for reducing the voltage in the secondary by saturation of the magnetic core.

18  
and a pair of secondary coil parts, the combination of a core having a primary and secondary core portions and a pair of shunt paths, one between the primary coil and each of the secondary coil parts, each having a reluctance greater than the reluctance of the secondary core portions.

5. In a transformer having a primary coil and a pair of secondary coil parts, the combination of a shell type magnetic core having primary and secondary core portions, and a magnetic envelope completely surrounding and enclosing said coils, and a pair of shunt paths each having a reluctance greater than the reluctance of the secondary core portions, said shunt paths being disposed between the surrounding or enclosing portions of the core and being also surrounded and enclosed by said surrounding and enclosing core portions.

6. In a transformer, the combination of a pair of laminated core stacks each having a pair of outer enclosing and central legs in register and in butt contact, primary and secondary coils surrounding the central legs and enclosed by said outer legs, and a pair of shunt paths between said central and outer legs, one on each of the opposite sides of said butt contact.

7. In a transformer, the combination of a pair of generally E-shaped core stocks having primary and secondary core portions and central confined and outer enclosing legs, a pair of secondary coils surrounding the central confined legs and enclosed magnetically by said outer legs, a primary coil disposed between said secondary coils, and a pair of shunt paths one between the primary coil and each of said secondary coils and each forming a shunt path for shunting the flux from the secondary portions of said core stacks after initial energization of the sec-

through the primary portion of the core as indicated at 96, 96 in Fig. 8. To these ends the shunt paths 87, 87 preferably have a reluctance higher than the reluctance of the secondary core portions.

We do not intend, of course, to be limited to the precise details or arrangements shown or described.

We claim:—

1. In a transformer having magnetic core means, the combination of a secondary comprising a pair of secondary coils, a primary coil disposed between said secondary coils and inducing a relatively high voltage therein, and shunt means between the primary coil and the secondary coils for reducing the voltage in the secondary by saturation of the magnetic core.

2. In a transformer having magnetic core means, the combination of a secondary comprising a pair of secondary coils, a primary coil disposed between said secondary coils and inducing a relatively high voltage therein, and means for reducing the voltage in the secondary by saturation of the magnetic core, said means including a pair of internal shunt paths with one interposed between the primary and each of said secondary coils.

3. In a transformer having magnetic core means, the combination of a secondary comprising a pair of secondary coils, a primary coil disposed between said secondary coils and inducing a relatively high voltage therein, and means for reducing the voltage in the secondary by saturation of the magnetic core, said means including a pair of internal shunt paths with one interposed between the primary and each of said secondary coils, and said magnetic core means being of the shell type with a magnetic envelope surrounding and enclosing said coils and said shunt paths.

4. In a transformer having a primary coil

secondary coils surrounding the central legs and enclosed by said outer legs, and a pair of shunt paths between said central and outer legs, one on each of the opposite sides of said butt contact.

7. In a transformer, the combination of a pair of generally E-shaped core stocks having primary and secondary core portions and central confined and outer enclosing legs, a pair of secondary coils surrounding the central confined legs and enclosed magnetically by said outer legs, a primary coil disposed between said secondary coils, and a pair of shunt paths one between the primary coil and each of said secondary coils and each forming a shunt path for shunting the flux from the secondary portions of said core stacks after initial energization of the secondary coils.

8. In a transformer, the combination of a pair of generally E-shaped core stacks having primary and secondary core portions and central confined and outer enclosing legs, a pair of secondary coils surrounding the central confined legs and enclosed magnetically by said outer legs, a primary coil disposed between said secondary coils, a pair of shunt paths one between the primary coil and each of said secondary coils and each forming a shunt path for shunting the flux from the secondary portions of said core stacks after initial energization of the secondary coils, and a grounded connection between said secondary coils.

9. In a transformer, the combination of a pair of laminated core stacks each having a pair of outer enclosing and central legs in register and in butt contact, primary and secondary coils surrounding the central legs and enclosed by said outer legs, a pair of shunt paths between said central and outer legs, one on each of the opposite sides of said

butt contact, said shunt paths comprising laminated stacks having pressed fit between the central and outer legs of said core stacks.

10. In a transformer, the combination of a pair of laminated core stacks each having outer enclosing and central legs in register and in butt contact, secondary coils surrounding the bases of said central legs and enclosed by said outer legs, and a primary coil interposed between said secondary coils, said primary coil surrounding the adjacent abutting ends of said central legs and also enclosed by said outer legs.

11. In a transformer, the combination of a pair of laminated core stacks each having outer enclosing and central legs in register and in butt contact, secondary coils, surrounding the bases of said central legs and enclosed by said outer legs, a primary coil interposed between said secondary coils, said primary coil surrounding the adjacent abutting ends of said central legs and also enclosed by said outer legs, and a pair of shunt paths between said central and outer legs and disposed between the opposite sides of said primary coil and said secondary coils.

12. A transformer including a closed-magnetic core structure, a primary winding on the core structure, a pair of secondary windings on the opposite sides of the primary winding, magnetic shunts on each side of the primary winding providing separate shunts for the fluxes linking the respective secondary windings, each of said shunts including an air gap, whereby when the core is unsaturated the shunts provide a negligible by-pass for the flux produced by the primary winding thereby permitting the induction of a relatively high secondary voltage, and when the core is saturated the shunts provide an appreciable by-pass for the flux, thereby reducing the voltage induced in the secondary winding.

13. Transformer means comprising the combination of magnetic core means, primary coil means, secondary coil means, one of said coil means consisting of a plurality of coil parts, and the other coil means being disposed between said coil parts and in balanced inductive relation thereto, and shunt means disposed between the parts of the plural coil part means and the other coil means for reducing the voltage in the secondary coil means by

and a ground connection between the coil parts of the plural coil part means.

15. Transformer means comprising the combination of magnetic core means, primary coil means, secondary coil means, one of said coil means consisting of a plurality of coil parts, and the other coil means being disposed between said coil parts and in balanced inductive relation thereto, and shunt means disposed between the parts of the plural coil part means and the other coil means for reducing the voltage in the secondary coil means by saturation of the magnetic core, said magnetic core means having a magnetic envelope surrounding and enclosing said coil means.

16. In a transformer, the combination of a pair of laminated core stacks, each having a pair of outer enclosing and central legs in register, a pair of secondary coil parts surrounding the central legs and enclosed by said outer legs, a primary coil disposed between said secondary coil parts and a pair of shunt paths one between the primary coil and each of said secondary coil parts.

17. In a stationary transformer, a magnetic core having secondary core portions, a pair of secondary winding portions, a primary winding disposed between said secondary winding portions, and stationary magnetic shunts one between the primary winding and each of said secondary winding portions, the permeability of the secondary core portions being changed by and substantially inversely with changes in load resistance.

18. A stationary transformer having a magnetic core, a pair of secondary winding portions, a primary winding disposed between said secondary winding portions, and stationary magnetic shunts one between the primary winding and each of said secondary winding portions, said primary and secondary windings being completely enclosed magnetically.

19. A stationary transformer having a magnetic core, a pair of secondary winding portions, a primary winding disposed between said secondary winding portions, stationary magnetic shunts one between the primary winding and each of said secondary winding portions, and a ground connection between the secondary winding portions.



one of said shunts being disposed between each of the parts of the plural coil part means and the other coil means.

21. Transformer means comprising the combination of magnetic core means, primary coil means, secondary coil means, one of said coil means consisting of a plurality of coil parts, and the other coil means being disposed between said coil parts, and shunt means disposed between the parts of the plural coil part means and the other coil means for reducing the voltage in one coil means as the core means becomes saturated, the coil parts of the plural coil part means being connected together uni-directionally.

In witness whereof, we hereunto subscribe our names this 11th day of July, 1928.

JAMES C. DALEY.  
EDWIN G. GODDARD.  
JOSEPH J. SOLA.

and in butt contact, secondary coils, surrounding the bases of said central legs and enclosed by said outer legs, a primary coil interposed between said secondary coils, said primary coil surrounding the adjacent abutting ends of said central legs and also enclosed by said outer legs, and a pair of shunt paths between said central and outer legs and disposed between the opposite sides of said primary coil and said secondary coils.

12. A transformer including a closed-magnetic core structure, a primary winding on the core structure, a pair of secondary windings on the opposite sides of the primary winding, magnetic shunts on each side of the primary winding providing separate shunts for the fluxes linking the respective secondary windings, each of said shunts including an air gap, whereby when the core is unsaturated the shunts provide a negligible by-pass for the flux produced by the primary winding thereby permitting the induction of a relatively high secondary voltage, and when the core is saturated the shunts provide an appreciable by-pass for the flux, thereby reducing the voltage induced in the secondary winding.

13. Transformer means comprising the combination of magnetic core means, primary coil means, secondary coil means, one of said coil means consisting of a plurality of coil parts, and the other coil means being disposed between said coil parts and in balanced inductive relation thereto, and shunt means disposed between the parts of the plural coil part means and the other coil means for reducing the voltage in the secondary coil means by saturation of the magnetic core.

14. Transformer means comprising the combination of magnetic core means, primary coil means, secondary coil means, one of said coil means consisting of a plurality of coil parts and the other coil means being disposed between said coil parts and in balanced inductive relation thereto, shunt means disposed between the parts of the plural coil part means and the other coil means for reducing the voltage in the secondary coil means by saturation of the magnetic core,

16. In a transformer, the combination of a pair of laminated core stacks, each having a pair of outer enclosing and central legs in register, a pair of secondary coil parts surrounding the central legs and enclosed by said outer legs, a primary coil disposed between said secondary coil parts and a pair of shunt paths, one between the primary coil and each of said secondary coil parts.

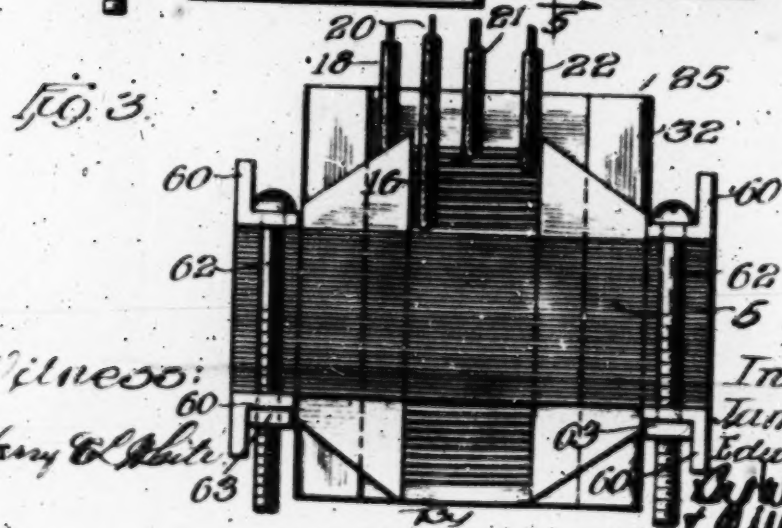
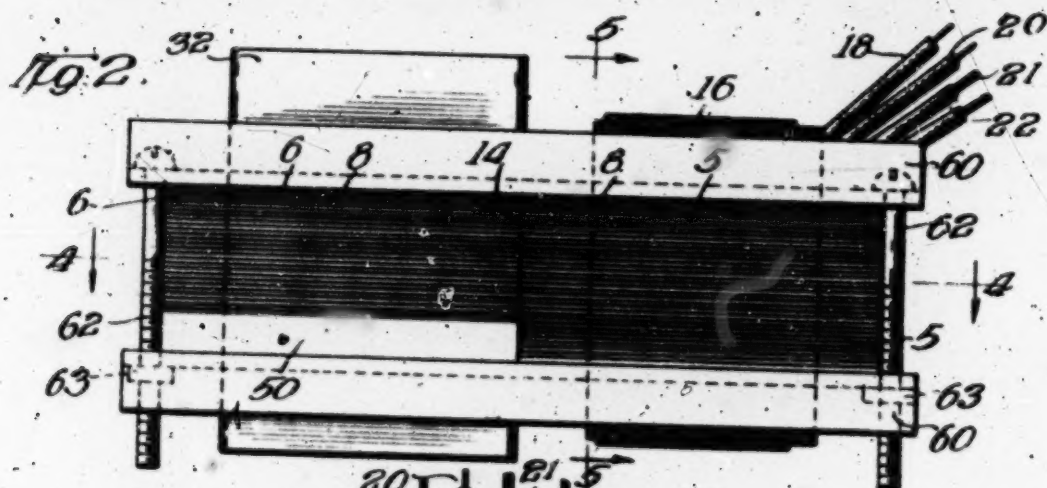
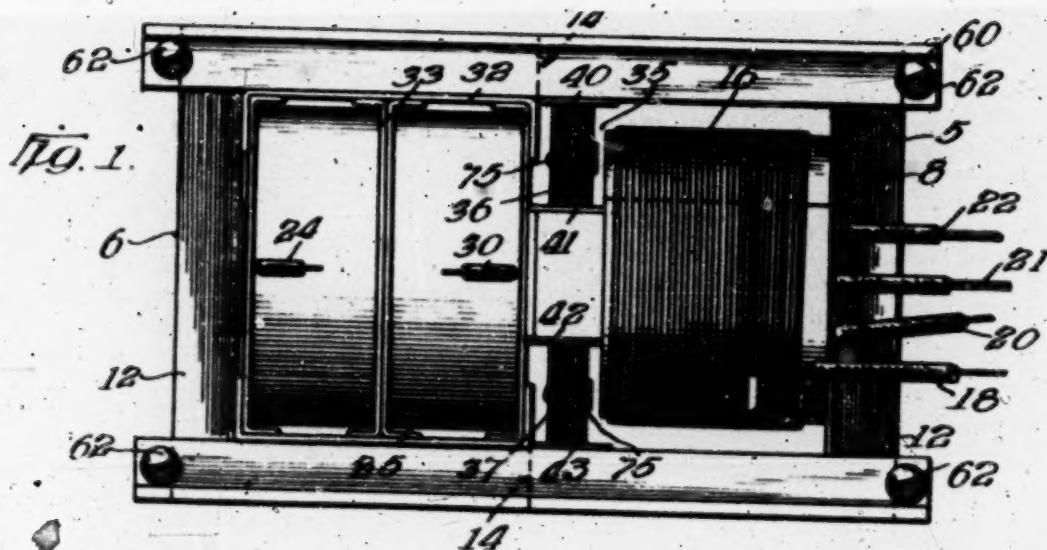
17. In a stationary transformer, a magnetic core having secondary core portions, a pair of secondary winding portions, a primary winding disposed between said secondary winding portions, and stationary magnetic shunts one between the primary winding and each of said secondary winding portions, the permeability of the secondary core portions being changed by and substantially inversely with changes in load resistance.

18. A stationary transformer having a magnetic core, a pair of secondary winding portions, a primary winding disposed between said secondary winding portions, and stationary magnetic shunts one between the primary winding and each of said secondary winding portions, said primary and secondary windings being completely enclosed magnetically.

19. A stationary transformer having a magnetic core, a pair of secondary winding portions, a primary winding disposed between said secondary winding portions, stationary magnetic shunts one between the primary winding and each of said secondary winding portions, and a ground connection between the secondary winding portions.

20. In a transformer, the combination of a magnetic core having a surrounding magnetic envelope and a magnetic leg enclosed thereby, primary coil means surrounding said enclosed leg and enclosed by said magnetic envelope, secondary coil means surrounding said enclosed leg and enclosed by said magnetic envelope, one of said coil means consisting of a plurality of coil parts and the other coil means being disposed between said coil parts and relatively stationary shunts enclosed by said magnetic envelope,





Witness:

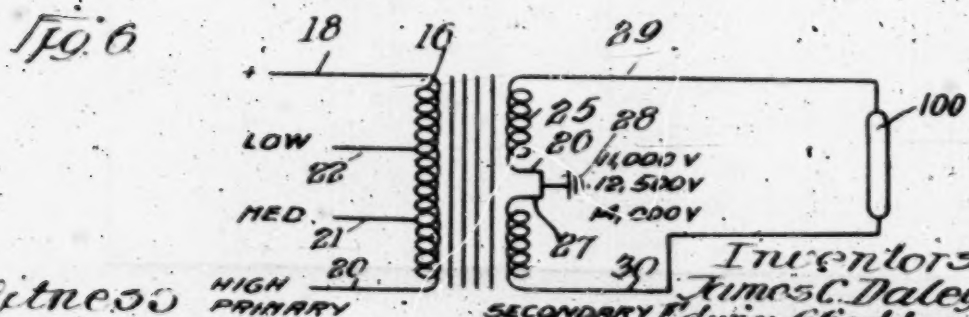
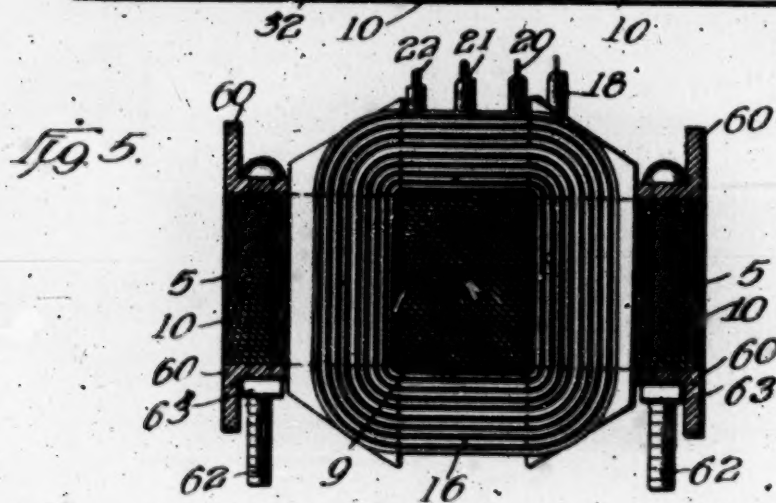
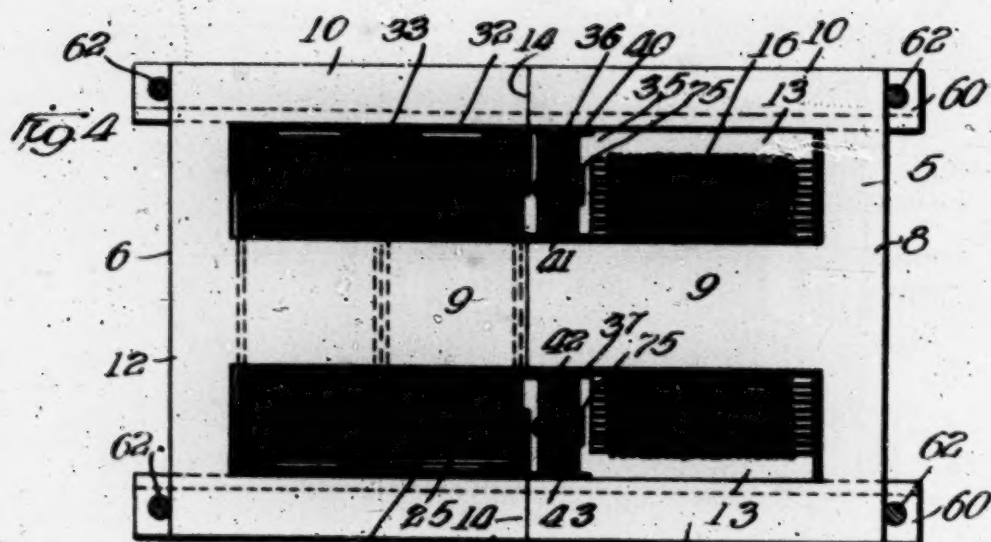
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Witness

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HIGH  
PRIMARY

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By

*AT 11/15*

TRANSFORMER

Application filed November 11, 1927. Serial No. 822,522.

This invention relates to improvements in transformers and pertains more particularly to transformers for neon or other gaseous lighting tubes.

5 These tubes require a relatively high initial or break-down voltage and a lower subsequent or normal operating voltage and it is the object of the present invention to provide a self compensating transformer for providing a relatively high or increased initial or starting voltage and thereafter a reduced or relatively low voltage for the decreased load following the greater initial starting or breakdown load.

15 While the invention has particular utility in connection with gaseous tubes and the like, it is to be understood that the invention is not limited to a particular use or purpose but may be employed for ignition purposes or wherever suitable or desired, as for example, wherever a relatively high initial voltage is desired followed by a reduced or relatively low voltage for a decrease in load.

25 According to the present invention, we provide the transformer with a shunt path which shunt path has a reluctance higher than the reluctance of the secondary core, so that upon initial energization of the primary winding substantially the entire magnetic flux spreads through the secondary core and a relatively high initial voltage is induced in the secondary winding. Upon energization of the secondary winding the opposition set up thereby, increases the reluctance of the secondary core beyond the reluctance of the shunt path, whereupon the reluctance of the shunt path is overcome and at least a part of the primary flux leaks through the shunt and threads back and through the primary field. 35 The flux threading through or intensity of the secondary field is thereby reduced with an accompanying reduction in the electromotive force and voltage in the secondary winding. The device may be designed to proportion, as desired, the leakage back through the shunt with respect to the flux which threads through the secondary core, by means of which the voltage which follows the relatively high initial voltage may be reduced as desired and effectively controlled.

We further find that by reducing the cross section of the secondary core below the cross section of the primary core, a natural stricture is produced between the main and secondary fields which stricture when disposed on the secondary side beyond the shunt, with the shunt on the primary side of the core with reference to the reduction in section produces a natural shunting tendency. We find that the smaller cross section of the secondary core enables a reduction in the section of the shunt path, which reduction in the section of the shunt reduces the space between the primary and secondary windings and enables reducing the dimensions of the entire device and increasing the size of the primary and secondary windings. This increases the compactness and efficiency of the device and the smaller section of the secondary core appears to saturate the secondary core to provide a high induced initial voltage, the opposition set up upon energization of the secondary winding apparently increasing the reluctance of the secondary field and decreasing the amount of flux thereafter required to saturate the same.

The present invention also preferably employs a butt joint or gap between the legs of the primary and secondary cores, which butt joint or gap is preferably disposed adjacent the end of the secondary winding and on the secondary side of the shunt and provides an additional retardation to the flux between the primary and secondary cores.

The invention further provides a self-contained, enclosed shunt and a device in which the effect thereon of external magnetic materials adjacent the device, such as metallic housings supporting brackets, or the like, is reduced and in which undesirable variations in the action or operation of the device, such as might be caused by different external magnetic materials are avoided.

Still further objects of the present invention are the provision of a generally improved and simplified construction that may be economically produced and which construction may be standardized for devices of different sizes and for devices of different types.



We reserve, of course, the right to correct or supplement the theory of action and advantages should it at any time become desirable.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a top plan view of a transformer embodying the invention;

Figure 2 is a side elevational view of the transformer shown in Figure 1;

Figure 3 is an end view;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a transverse section taken on the line 5—5 of Figure 1; and

Figure 6 is a wiring diagram of the transformer selected for illustration.

Referring to the drawings the transformer shown is of the shell or confined type having a main core 5 and a secondary core 6.

The main and secondary cores 5 and 6 each comprises a plurality of similar stacked laminations 8, said laminations 8 being suitably shaped to form a central extension around which the transformer coils or windings are wound and outer legs which form a laminated iron ring or envelope surrounding or enclosing the coils. While the laminations 8 may be of any desired or preferred form or configuration they are preferably and are shown as of E-shaped form, each having a central or intermediate leg 9 and outer legs 10 extending from a connecting base 12 with coil or winding receiving spaces 13 formed between the central and outer legs of each lamination, these spaces 13 opening from one end of each core stack and being closed at the other end by the base portion 12 of the E-shaped laminations.

The transformer is assembled with the end of the primary core 5 from which the spaces 13 open, in opposition to the corresponding end of the secondary core 6 and with the central and outer legs 9 and 10 in register and preferably in abutting contact. A closed magnetic ring or envelope divided longitudinally by the central legs 9 is thus formed with butt joints 14 between the ends of the legs of the two laminated core stacks. Where we use the expression butt joint or gap between the primary and secondary cores in this specification or in the appended claims, either term is used in a broad sense and we intend that they be interchangeable.

dium and low leads or taps 20, 21 and 22 respectively, for connection with the other side of the source of current depending upon the voltage required by the gaseous tube or other device connected across the terminals of the secondary winding. The particular manner of connecting the source of current across the primary winding and the number of leads or connections therefore may, of course, be varied widely within the scope of the present invention.

While it is to be understood that there may be a plurality of secondary windings and that any suitable or preferred arrangement thereof may be employed, we have, for purposes of illustration shown a single secondary winding 25 wound about or encircling the central leg 9 of the secondary core 6 with the turns of the secondary winding passing through the spaces 13 and between the central leg 9 and outer legs 10 of the secondary core. The secondary coil 25 is shown as being sectionalized centrally at 26 with the sections connected as illustrated diagrammatically at 27 in Figure 6 and grounded through the central connection 27 as shown at 28. The secondary winding 25 is provided with terminal leads 29 and 30 for connection across the gaseous tube or other device which is to be supplied from the secondary winding of the transformer. A gaseous tube 100 is shown more or less diagrammatically in Figure 6 as connected across the leads 29 and 30.

It is to be understood, of course, that the turns of the primary and secondary windings are insulated from each other and from the magnetic core as desired and in any suitable or preferred manner as well understood in the art. The secondary coil or winding 25 shown is inclosed in a generally rectangular open ended box-like insulating structure of "micanite" or other suitable material. This structure designated at 32 forms an intervening insulating barrier between the secondary winding and the outer legs 10 and base 12 of the secondary core, as well as between this winding and the shunt to be hereinafter referred to. This intervening insulating barrier is provided with an insulating partition 33 which may be of similar insulating material and is disposed between the sections of the secondary coils 25.

The shunt designated in its entirety at 35 comprises a pair of transversely laminated

line 4-4 of Figure 2;

Figure 5 is a transverse section taken on the line 5-5 of Figure 1; and

Figure 6 is a wiring diagram of the transformer selected for illustration.

Referring to the drawings the transformer shown is of the shell or confined type having a main core 5 and a secondary core 6.

The main and secondary cores 5 and 6 each comprises a plurality of similar stacked laminations 8, said laminations 8 being suitably shaped to form a central extension around which the transformer coils or windings are wound and outer legs which form a laminated iron ring or envelope surrounding or enclosing the coils. While the laminations 8 may be of any desired or preferred form or configuration they are preferably and are shown as of E-shaped form, each having a central or intermediate leg 9 and outer legs 10 extending from a connecting base 12 with coil or winding receiving spaces 13 formed between the central and outer legs of each lamination, these spaces 13 opening from one end of each core stack and being closed at the other end by the base portion 12 of the E-shaped laminations.

The transformer is assembled with the end of the primary core 5 from which the spaces 13 open, in opposition to the corresponding end of the secondary core 6 and with the central and outer legs 9 and 10 in register and preferably in abutting contact. A closed magnetic ring or envelope divided longitudinally by the central legs 9 is thus formed with butt joints 14 between the ends of the legs of the two laminated core stacks. Where we use the expression butt joint or gap between the primary and secondary cores in this specification or in the appended claims, either term is used in a broad sense and we intend that they be interchangeable.

Any desired or preferred arrangement of transformer coils or windings may be employed. For the purpose of illustration we have shown a single primary coil or winding 16 wound around or encircling the central leg 9 of the primary core 5 through the spaces 13 and between the central leg 9 and outer legs 10 of the primary core. The primary winding 16 is shown as provided with a terminal lead 18 for connection with one side of the source of current and with high, ab-

be a plurality of secondary windings and that any suitable or preferred arrangement thereof may be employed, we have, for purposes of illustration shown a single secondary winding 25 wound about or encircling the central leg 9 of the secondary core 6 with the turns of the secondary winding passing through the spaces 13 and between the central leg 9 and outer legs 10 of the secondary core. The secondary coil 25 is shown as being sectionalized centrally 26 with the sections connected as illustrated diagrammatically at 27 in Figure 6 and grounded through the central connection 27 as shown at 28. The secondary winding 25 is provided with terminal leads 29 and 30 for connection across the gaseous tube or other device which is to be supplied from the secondary winding of the transformer. A gaseous tube 100 is shown more or less diagrammatically in Figure 6 as connected across the leads 29 and 30.

It is to be understood, of course, that the turns of the primary and secondary windings are insulated from each other and from the magnetic core as desired and in any suitable or preferred manner as well understood in the art. The secondary coil or winding 25 shown is inclosed in a generally rectangular open ended box 32 insulating structure of "micanite" or other suitable material. This structure designated at 32 forms an intervening insulating barrier between the secondary winding and the outer legs 10 and base 12 of the secondary core, as well as between this winding and the shunt to be hereinafter referred to. This intervening insulating barrier is provided with an insulating partition 33 which may be of similar insulating material and is disposed between the sections of the secondary coils 25.

The shunt designated in its entirety at 35 comprises a pair of transversely laminated stacks 36 and 37 disposed between the legs of the primary core 5 adjacent the butt joint 14 and on the primary side. The butt joint 14 is adjacent the primary end of the secondary winding and the shunt path is disposed between the legs of the primary core adjacent the butt joint 14 and on the primary core side as well as between the primary and secondary windings. For the purpose of illustration the shunt stack 36 has an insulating barrier 40 between it and the adjacent outer leg 10 of



the primary core with a similar insulating barrier 41 between the opposite end of the shunt stack 36 and the central or intermediate leg 9 of the primary core and the shunt stack 37 has similar insulating barriers 42 and 43 between the central or intermediate leg of the primary core and one end of the shunt stack 37 and between the opposite end of the shunt stack and the adjacent outer leg 10 of the primary core. These insulating barriers 40, 41, 42 and 43 which may be of red fibre or other suitable insulating material provide gaps or insulating barriers in each of the shunt stacks 36 and 37, it being understood that although the particular arrangement shown and described in detail provides two gaps in each shunt stack, one gap or any desired number of gaps may be provided in each shunt stack as suitable or preferred.

In operation the exciting current is applied across the desired terminals of the primary winding 16. This exciting current is of relatively high electromotive force and upon initial energization of the primary winding substantially the entire magnetic flux threads through the primary and secondary cores and the relative great initial intensity in the secondary field provides a high induced initial voltage in the secondary winding. This relatively high initial voltage in the secondary winding is particularly desirable in the initial breaking down of or ionization of the gases in a neon or other gaseous tube.

The shunt path 35 has a reluctance higher than the reluctance of the secondary core so that upon initial energization of the primary winding substantially the entire magnetic flux threads through the secondary core to provide the high initial voltage in the secondary winding as referred to and then upon energization of the secondary coil or winding, the opposition set up increases the reluctance of the secondary core and thereafter the amount of flux required to saturate the secondary core. Upon energization of the secondary winding the increase in reluctance of the secondary core with the decrease in the amount of flux required to saturate the same causes the magnetic flux threading through the primary core to break down or overcome

back through the shunt path with respect to the flux which threads through the secondary core, by means of which the voltage which follows the relatively high initial voltage may be reduced as desired and effectively controlled.

The cross section of the secondary core 6 is preferably less than that of the primary core. This smaller section in the secondary core may be conveniently provided in the embodiment illustrated by stacking fewer laminations in the secondary core than in the primary core and blocking the reduced height of the secondary core 6 up to the height of the primary core by means of suitable blocks or strips 50 of wood or other suitable insulating material. The reduction in section of the secondary core not only results in saturating the secondary core to provide a high induced initial voltage and decreases the flux required to saturate the secondary core but apparently decreases the amount of flux which is shunted through the shunt path 35 upon energization of the secondary winding. This enables a reduction in the section of the shunt 35 which reduces the space between the primary and secondary windings and increases the space allowed for these windings in a device of given size. The size of the windings may thereby be increased. The resulting device is exceedingly compact and the cost is reduced.

In the particular device illustrated the core laminations are standardized, that is the same laminations are employed in both the primary and secondary cores and these laminations may be standardized with the core laminations of transformers of other types. As already pointed out the transformer of the present invention is not limited to any particular use or purpose but may be employed as and where suitable or desired and may be made up in any desired size.

In the particular embodiment shown the laminations of both the primary and secondary cores are clamped on each side between a pair of clamp bars or brackets 60. These bars or brackets 60 may be of angle iron formation, as shown, and their opposite ends project beyond the closed end of the primary

stantially the entire magnetic flux threads through the primary and secondary cores and the relative great initial intensity in the secondary field provides a high induced initial voltage in the secondary winding. This relatively high initial voltage in the secondary winding is particularly desirable in the initial breaking down of or ionization of the gases in a neon or other gaseous tube.

The shunt path 35 has a reluctance higher than the reluctance of the secondary core so that upon initial energization of the primary winding substantially the entire magnetic flux threads through the secondary core to provide the high initial voltage in the secondary winding as referred to and then upon energization of the secondary coil or winding, the opposition set up increases the reluctance of the secondary core and thereafter the amount of flux required to saturate the secondary core. Upon energization of the secondary winding the increase in reluctance of the secondary core with the decrease in the amount of flux required to saturate the same causes the magnetic flux threading through the primary core to break down or overcome the reluctance of the shunt path and at least a part of the primary flux leaks through the shunt path 35 and threads back through the primary core. As already pointed out the flux threading through and intensity of the secondary field is thereby reduced with an accompanying reduction in the voltage in the secondary winding below the relatively high initial voltage. This is particularly desirable in connection with gaseous tubes and the like where a relatively high initial voltage is required and thereafter the voltage required to operate or maintain the tube lighted is less.

As already pointed out the device may be designed to proportion as desired the leakage

duction in the section of the shunt 35 which reduces the space between the primary and secondary windings and increases the space allowed for these windings in a device of given size. The size of the windings may thereby be increased. The resulting device is exceedingly compact and the cost is reduced.

In the particular device illustrated the core laminations are standardized, that is the same laminations are employed in both the primary and secondary cores and these laminations may be standardized with the core laminations of transformers of other types. As already pointed out the transformer of the present invention is not limited to any particular use or purpose but may be employed as and where suitable or desired and may be made up in any desired size.

In the particular embodiment shown the laminations of both the primary and secondary cores are clamped on each side between a pair of clamp bars or brackets 60. These bars or brackets 60 may be of angle iron formation, as shown, and their opposite ends project beyond the closed end of the primary core at one end and beyond the closed end of the secondary core at the opposite end. These projecting ends of the bars or brackets 60 are provided with registering apertures through which extend clamping bolts 62, each provided with a head engageable with one bar or bracket 60 and having threaded engagement beyond the other bar or bracket with a suitable nut 63 for clamping and securing the assembled core laminations together. The blocks or strips 50 block the secondary core up to the same height as the primary core and the bars or brackets 60 form a common clamping frame for both cores of the transformer

and for binding the two cores together into a unitary device.

The shunt stacks 36 and 37 may have pressed fit between the legs of the primary core 5 or they may be otherwise mounted therebetween. The pressed fit of the shunt stacks 36 and 37 enables conveniently adjusting the position of these stacks between the legs of the primary core which provides a convenient adjustment for adjusting and rating the device.

The transformer may be arranged in any suitable casing or housing which has been omitted for the sake of clarity and it may be mounted upon metal brackets or adjacent external magnetic materials without being affected thereby and without any undesirable variation in the action or operation of the device.

The laminations of the shunt sticks 36 and 37 may be suitably bound or secured together as by means of rivets 75, studs passing through the stacks and headed over or by any other suitable or preferred means.

It is to be understood that the laminations of the primary and secondary cores, although shown alike, may be different from each other with respect to form or type as well as of different sizes relative to each other.

It is also to be understood that the central leg of the secondary core may be of a width less than the width of the central leg of the primary core and where there is a shunt it may be adjustably held in other manners than by means of the pressed fit shown.

It is to be still further understood that the larger cross section primary may be employed with the smaller cross section secondary with the shunt. In this case the greater density in the secondary will provide a self compensation by a flux leakage to atmosphere instead of thru the shunt between the legs of the primary.

With the arrangement illustrated the entire shunt is in the primary and the gap or butt joint between the legs of the primary and secondary cores lies in a common transverse plane.

We claim:—

1. In a transformer having a primary coil for connection with the exciting current, a secondary, primary and secondary cores, and

primary and secondary cores, and a shunt between the legs of the primary core adjacent said joint and on the primary core side.

3. In a transformer having primary and secondary coils, the combination of a primary core, a secondary core, a butt joint between the primary and secondary cores, and a shunt adjacent said joint and on the primary side thereof for shunting the primary flux back through the primary core following energization of the secondary coil.

4. In a transformer having primary and secondary coils, the combination of a primary core, a secondary core having a cross section less than the cross section of the primary core, a butt joint between the primary and secondary cores, and a shunt adjacent said joint and on the primary side thereof for shunting the primary flux back through the primary core following energization of the secondary coil.

5. In a transformer having primary and secondary coils, the combination of a primary core, a secondary core having a cross section less than the cross section of the primary core, a butt joint between the primary and secondary cores, a shunt adjacent said joint and on the primary side thereof for shunting the primary flux back through the primary core following energization of the secondary coil, and a gap in said shunt increasing the open circuit reluctance of the shunt beyond the open circuit reluctance of the secondary core.

6. A transformer comprising primary and secondary coils having separate laminated cores therefor, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core.

7. A transformer comprising a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary



with respect to form or type as well as of different sizes relative to each other.

30 It is also to be understood that the central leg of the secondary core may be of a width less than the width of the central leg of the primary core and where there is a shunt it may be adjustably held in other manners than  
35 by means of the pressed fit shown.

It is to be still further understood that the larger cross section primary may be employed with the smaller cross section secondary with the shunt. In this case the greater density in  
40 the secondary will provide a self compensation by a flux leakage to atmosphere instead of thru the shunt between the legs of the primary.

With the arrangement illustrated the entire shunt is in the primary and the gap or butt joint between the legs of the primary and secondary cores lies in a common transverse plane.

We claim:—

50 1. In a transformer having a primary coil for connection with the exciting current, a secondary, primary and secondary cores, and means in said transformer for inducing a relatively high initial voltage in the secondary and for thereafter decreasing the voltage  
55 in the secondary, said means including a shunt path in the primary core and a butt joint between the primary and secondary cores adjacent said shunt and on the secondary side thereof.

2. In a transformer having a primary coil for connection with the current supply, a secondary, a primary core, a secondary core having a cross section less than that of the  
60 primary core, a butt joint between the pri-

primary flux back through the primary core following energization of the secondary coil, and a gap in said shunt increasing the open circuit reluctance of the shunt beyond the open circuit reluctance of the secondary core.

6. A transformer comprising primary and secondary coils having separate laminated cores therefor, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater  
10 than the open circuit reluctance of the secondary core.

7. A transformer comprising a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core.

8. A transformer comprising primary and secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core.

9. A transformer comprising primary and

secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core, said shunt comprising laminated shunt stacks interposed between the outer and central legs of the primary core and each insulated at its opposite ends from said legs.

10. A transformer comprising primary and secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core, said shunt comprising laminated shunt stacks interposed between the outer and central legs of the primary core and each insulated at its opposite ends from said legs, said stacks having pressed fit between said main core legs and being adjustable therebetween.

11. In a transformer having primary and secondary coils, the combination of a generally E-shaped primary core, a generally E-shaped secondary core of a cross section less than the cross section of the primary core and a butt joint between the legs of the cores and lying in a common transverse plane.

12. In a transformer having primary and secondary coils, the combination of a generally E-shaped primary core, a generally E-shaped secondary core and a butt joint between the legs of the cores and lying in a common transverse plane.

13. A transformer comprising primary and secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core,

comprising a laminated shunt stack adjustably supported between the legs of the primary core.

15. A transformer comprising primary and secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having registering legs in butt contact, and a shunt between the legs of the primary core, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core and comprising a laminated shunt stack adjustably supported between the legs of the primary core and having an insulated gap therein.

16. In a transformer having primary and secondary coils, the combination of a shell type magnetic core having a magnetic envelope completely surrounding and enclosing said coils and having a primary core part and a secondary core part, a shunt for the primary core part and having a reluctance greater than the reluctance of the secondary core part, and a butt joint in the coil surrounding envelope of said magnetic core.

17. In a transformer having primary and secondary coils, the combination of a shell type magnetic core having a magnetic envelope completely surrounding and enclosing said coils and having a primary core part and a secondary core part, a shunt for the primary core part and having a reluctance greater than the reluctance of the secondary core part, and a gap in said shunt increasing the open circuit reluctance of the shunt beyond the open circuit reluctance of the secondary core part.

18. A transformer, comprising a pair of laminated magnetic core stacks, each having inner confined and outer enclosing legs in register and in butt contact, primary and secondary coils surrounding the inner confined legs of said core stacks, and an internal and confined shunt between the inner confined and outer enclosing legs of one core stack.

19. A transformer, comprising a pair of



core, a laminated secondary core of a cross section less than that of the primary core, said cores having central and enclosing legs in register and in butt contact and a shunt between the enclosing and central legs of the primary core adjacent said butt contact and on the primary side, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core, said shunt comprising laminated shunt stacks interposed between the outer and central legs of the primary core and each insulated at its opposite ends from said legs, said stacks having pressed fit between said main core legs and being adjustable therebetween.

11. In a transformer having primary and secondary coils, the combination of a generally E-shaped primary core, a generally E-shaped secondary core of a cross section less than the cross section of the primary core and a butt joint between the legs of the cores and lying in a common transverse plane.

12. In a transformer having primary and secondary coils, the combination of a generally E-shaped primary core, a generally E-shaped secondary core and a butt joint between the legs of the cores and lying in a common transverse plane.

13. A transformer comprising primary and secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having registering legs in butt contact, and a shunt between the legs of the primary core, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core and comprising a laminated shunt stack interposed between the legs of the primary core.

14. A transformer comprising primary and secondary coils, a laminated primary core, a laminated secondary core of a cross section less than that of the primary core, said cores having registering legs in butt contact, and a shunt between the legs of the primary core, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core and

16. In a transformer having primary and secondary coils, the combination of a shell type magnetic core having a magnetic envelope completely surrounding and enclosing said coils and having a primary core part and a secondary core part, a shunt for the primary core part and having a reluctance greater than the reluctance of the secondary core part, and a butt joint in the coil surrounding envelope of said magnetic core.

17. In a transformer having primary and secondary coils, the combination of a shell type magnetic core having a magnetic envelope completely surrounding and enclosing said coils and having a primary core part and a secondary core part, a shunt for the primary core part and having a reluctance greater than the reluctance of the secondary core part, and a gap in said shunt increasing the open circuit reluctance of the shunt beyond the open circuit reluctance of the secondary core part.

18. A transformer, comprising a pair of laminated magnetic core stacks, each having inner confined and outer enclosing legs in register and in butt contact, primary and secondary coils surrounding the inner confined legs of said core stacks, and an internal and confined shunt between the inner confined and outer enclosing legs of one core stack.

19. A transformer, comprising a pair of laminated magnetic core stacks, each having inner confined and outer enclosing legs in register and in butt contact, said core stacks forming primary and secondary core parts, primary and secondary coils surrounding the inner confined legs of said core stacks, and an internal and confined shunt between the inner confined and outer enclosing legs of one core, said shunt having an open circuit reluctance greater than the open circuit reluctance of the secondary core part.

20. In a transformer having primary and secondary coils, the combination of a pair of cores each having a pair of outer coil enclosing legs and an inner intermediate leg,

a base connecting the outer and inner legs at the outer end of each core and completing the coil enclosure, said outer and inner legs of each core being open at the inner ends of the cores, and a butt joint between the inner open ends of the inner and outer legs of said cores, and lying in a common transverse plane.

21. In a transformer having primary and secondary coils, the combination of a pair of generally E-shaped cores, inverted with reference to each other and each having a pair of outer and an intermediate leg closed at the outer ends and open and in register at the inner ends of the cores with a butt joint between the inner ends of said outer and inner legs, and lying in a common transverse plane.

22. In a transformer having primary and secondary coils, the combination of a core comprising a pair of laminated core stacks each having a base portion and inner confined and outer enclosing legs extending from the base portions, said stacks being assembled in inverted relation with respect to each other with the base portions of the respective stacks at opposite ends of the core to form with the outer legs of the stacks a surrounding magnetic envelope and with the ends of the inner and outer legs in register and in butt contact.

23. In a transformer, the combination of a pair of laminated core stacks each having a base portion with inner confined and outer enclosing leg means extending from said base portions, said stacks being assembled in inverted relation with respect to each other with the base portions of the respective stacks at opposite ends of the core to form with the outer legs of the stacks a surrounding magnetic envelope and with the ends of the inner and outer leg means in register and in butt contact, a pair of secondary coil parts surrounding the inner leg means and enclosed by the outer leg means, a ground connection between said secondary coil parts and a primary coil also surrounding the central leg means and enclosed by the outer leg means.

24. In a transformer, a core comprising a pair of laminated core stacks each having a base portion with inner confined and outer enclosing legs extending therefrom, said stacks being assembled in inverted relation

enclosing legs extending therefrom, said stacks being assembled in inverted relation with respect to each other with the base portions of the respective stacks at opposite ends of the core to form with the outer legs of the stacks a surrounding magnetic envelope and with the ends of the inner and outer legs in register and in butt contact, means for clamping the laminations of the stacks together and for holding the two stacks in assembled relation with respect to each other, said means comprising clamping means extending along the top of the core, clamping means extending along the bottom of the core, and means for clamping said means together with the core stacks assembled therebetween.

25. In a transformer, the combination of a core having outer enclosing and inner leg means, a pair of stationary secondary coil parts surrounding the central leg means and enclosed by the outer leg means, a ground connection between the secondary coil parts, a primary coil also surrounding the central leg means and enclosed by the outer leg means, and stationary shunt means disposed between said central and outer leg means for reducing the voltage in the secondary coil means by saturation of the magnetic core.

In witness whereof, we hereunto subscribe our names this 8th day of November, 1927.

JAMES C. DALEY.  
EDWIN G. GODDARD.

12 at the inner ends of the cores with a butt joint between the inner ends of said outer and inner legs, and lying in a common transverse plane.

22. In a transformer having primary and secondary coils, the combination of a core comprising a pair of laminated core stacks each having a base portion and inner confined and outer enclosing legs extending from the base portions, said stacks being assembled in inverted relation with respect to each other with the base portions of the respective stacks at opposite ends of the core to form with the outer legs of the stacks a surrounding magnetic envelope and with the ends of the inner and outer legs in register and in butt contact.

23. In a transformer, the combination of a pair of laminated core stacks each having a base portion with inner confined and outer enclosing leg means extending from said base portions, said stacks being assembled in inverted relation with respect to each other with the base portions of the respective stacks at opposite ends of the core to form with the outer legs of the stacks a surrounding magnetic envelope and with the ends of the inner and outer leg means in register and in butt contact, a pair of secondary coil parts surrounding the inner leg means and enclosed by the outer leg means, a ground connection between said secondary coil parts and a primary coil also surrounding the central leg means and enclosed by the outer leg means.

24. In a transformer, a core comprising a pair of laminated core stacks each having a base portion with inner confined and outer enclosing legs extending therefrom, said stacks being assembled in inverted relation with respect to each other with the base portions of the respective stacks at opposite ends of the core to form with the outer legs of the stacks a surrounding magnetic envelope and with the ends of the inner and outer legs in register and in butt contact, and means for clamping the laminations of the stacks together and for holding the two stacks in assembled relation with respect to each other.

25. In a transformer, a core comprising a pair of laminated core stacks each having a base portion with inner confined and outer

of the core, and means for clamping said means together with the core stacks assembled therebetween.

26. In a transformer, the combination of a core having outer enclosing and inner leg means, a pair of stationary secondary coil parts surrounding the central leg means and enclosed by the outer leg means, a ground connection between the secondary coil parts, a primary coil also surrounding the central leg means and enclosed by the outer leg means, and stationary shunt means disposed between said central and outer leg means for reducing the voltage in the secondary coil means by saturation of the magnetic core.

In witness whereof, we hereunto subscribe our names this 8th day of November, 1927.

JAMES C. DALEY.

EDWIN G. GODDARD.







[fol. 37] IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

**DEFENDANT'S MOTION FOR BILL OF PARTICULARS UNDER RULE  
12(e)—Filed June 13, 1940**

Now comes the defendant, by its attorney, and moves this Honorable Court for an order directing the plaintiff to serve and file a bill of particulars herein as to the following matters:

1. State or identify precisely what licensed transformer or transformers have been manufactured and sold by the defendant that the plaintiff claims in paragraph 7 of the complaint have not been reported by the defendant to the plaintiff and on which royalties have not been paid by the defendant to the plaintiff as required by the license agreement made August 26, 1935 by the parties, Exhibit A of the complaint.

2. State or identify precisely what modified transformer or transformers have been manufactured and sold by the defendant that the plaintiff claims in paragraph 8 of the complaint, that portion of said paragraph ahead of the semicolon in line 7 thereof, fall within the provisions of said license agreement and on which the defendant has not paid royalties to the plaintiff.

3. State or identify precisely what modified transformer or transformers have been manufactured and sold by the defendant that the plaintiff claims in paragraph 8 of the complaint, that portion of said paragraph following the semicolon in line 7 thereof, were licensed transformers and have not been reported by the defendant to the plaintiff and on which royalties have not been paid by the defendant to the plaintiff.

4. State the particular claim or claims of the Letters Patent No. 1,777,256, dated September 30, 1930, referred [fol. 38] to in the complaint on which the plaintiff will rely at the trial to sustain its charges of unreported sales and non-payment of royalties by the defendant to the plaintiff

under said Letters Patent and said license agreement with respect to—

(a) Each and every transformer identified or specified by the plaintiff in its answer to item 1 hereof;

(b) Each and every transformer identified or specified by the plaintiff in its answer to item 2 hereof; and

(c) Each and every transformer identified or specified by the plaintiff in its answer to item 3 hereof.

Leslie W. Fricke, Attorney for Defendant.

June 13, 1940.

• • • • •  
IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

PLAINTIFF'S BILL OF PARTICULARS—Filed June 18, 1940

Now comes the plaintiff, by its attorneys, and files its bill of particulars in response to defendant's motion therefor, as follows:

1. A partial examination of defendant's books and records reveals that:

(a) Defendant has not computed and paid royalties on the complete licensed transformers of the core and coil arrangement illustrated, for example, on page 9 of defendant's catalog SM-10, including attachments, and has not computed and paid royalties on such transformers and/or attachments as if sold f. o. b. Chicago as required by contract Exhibit A, bill of complaint, and the full amount of royalties due under such contract on such sales has not been paid to plaintiff.

(b) As to licensed transformers of the core and coil arrangement illustrated at page 9 of defendant's catalog [fol. 39] SM-10, upon which royalties in whole or in part were paid, and which transformers were later returned by the purchasers, credit for such royalties has been given de-

fendant by plaintiff, but later such transformers have again been sold, without payment of royalties thereon as required by the license contract Exhibit A, bill of complaint.

2. As at present advised, defendant is manufacturing and selling transformers of the core and coil arrangement illustrated at page 1 of defendant's bulletin LT-24, upon which no royalties have been or are being paid unto plaintiff.

3. With respect to paragraph 8 of the bill of complaint, more particularly that portion following the semi-colon in line 7 thereof, as at present advised, the transformers manufactured and sold by defendant of the core and coil arrangement illustrated at page 1 of defendant's bulletin LT-24 are those transformers as to which no report of sales has been made and no royalties have been paid to plaintiff by defendant as required by said license contract, Exhibit A, bill of complaint. Since plaintiff is without knowledge as to the full extent of defendant's manufacture and sale of transformers, there may be other constructions or arrangements of which plaintiff has no present knowledge which answer the description and are open to the charge of said portion of paragraph 8 of the bill of complaint. Plaintiff therefore reserves its right to include any such transformers in any decree entered in this cause and in any accounting herein awarded.

4. As at present advised:

(a) Plaintiff charges the defendant's transformers identified or described in paragraph 1 hereof to embody and utilize the invention or inventions of claims 1, 2, 4, 11, 12, 13, 14, 15, 17, 19, and 21, of Letters Patent No. 1,777,256 of Daley, et al.;

(b) Plaintiff charges the defendant's transformers identified or described in paragraph 2 hereof to embody and utilize the invention or inventions of claims 1, 2, 4, 11, 12, 13, 14, 15, 17, 19, and 21, of Letters Patent No. 1,777,256 of Daley, et al.; and

(c) Plaintiff charges the defendant's transformers identified or described in paragraph 3 hereof to embody and utilize the invention or inventions of claims 1, 2, 4, 11, 12,

[fol. 40] 13, 14, 15, 17, 19, and 21, of Letters Patent no. 1,777,256 of Daley, et al.

Respectfully submitted, Jefferson Electric Company,  
by Thos. H. Sheridan, Of Counsel.

F. Thrall Brewer, Sheridan, Davis & Cargill, Solicitors  
and Of Counsel.

June 18, 1940.

Received a copy of the foregoing Plaintiff's Bill of Particulars this 18th day of June, 1940.

Leslie W. Fricke, Solicitors for Defendant.

IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

DEFENDANT'S ANSWER TO COMPLAINT—Filed July 9, 1940

Defendant, answering the complaint in the above entitled action as supplemented by plaintiff's bill of particulars filed herein on or about June 18, 1940, states as follows:

1. Defendant admits the allegations of paragraph 1 of the complaint.
2. Defendant admits the allegations of paragraph 2 of the complaint.
3. Defendant admits the allegations of paragraph 3 of the complaint.
4. Answering paragraph 4 of the complaint, defendant admits that it is licensed under Letters Patent No. 1,777,256, referred to in the complaint, to manufacture and sell transformers covered thereby, but defendant is without sufficient knowledge concerning the other allegations of said paragraph to answer and, therefore, denies the same and leaves the plaintiff to its proofs thereof.
5. Answering paragraph 5 of the complaint, defend-  
[fol. 41] ant admits that the license to it was granted under date of August 26, 1935, that said license has not



been cancelled by either party, that said license inter alia requires the defendant to pay a royalty to the plaintiff based on defendant's net invoice price of all licensed transformers manufactured and sold by it, to make reports at stated periods as to the number of licensed transformers so manufactured and sold, and to perform other lawful acts as in the license agreement specified, and the defendant admits that Exhibit A attached to the complaint is a true copy of said license agreement; but defendant denies that said license agreement requires the defendant to mark all license transformers made by it in accordance with the statute by placing thereon the number of the above mentioned patent, and the defendant avers that said license agreement is based on Letters Patent other than the above mentioned No. 1,777,256, and that said license agreement only requires the defendant to place on licensed transformers the number of said Letters Patent No. 1,777,256 if the same embodies the invention of said Letters Patent No. 1,777,256; and defendant denies that said license agreement requires the defendant to select and register with plaintiff a trade-mark for the purpose of identifying the licensed transformers made by defendant, and defendant avers that said license agreement merely requires the defendant to mark on each licensed transformer the trade-mark, or other symbol, word, figure or mark identifying the device as having been manufactured by defendant.

6. Answering paragraph 6 of the complaint, defendant denies that it has failed in any respect to abide by the provisions of the license agreement between it and the plaintiff; and, excepting the payments that defendant has admittedly made to the plaintiff under said license agreement, the defendant is without knowledge as to the other allegations of said paragraph 6 and, therefore, denies the same and leaves the plaintiff to its proofs thereof.

7. Answering paragraph 7 of the complaint, as supplemented by sub-paragraphs (a) and (b) of main paragraph 1 of plaintiff's said bill of particulars, defendant denies that since the date of the license agreement in ostensible compliance or otherwise with the terms thereof defendant has from time to time filed reports with plaintiff which purported to set forth the actual number of transformers [fol. 42] manufactured and sold by it, and defendant avers

that it has from time to time as required by said license agreement filed reports with plaintiff which purported to and in fact did set forth the actual number of licensed transformers manufactured and sold by it under said agreement; defendant admits that it has from time to time paid certain sums on the transformers covered by said reports; defendant admits and avers that it has affixed the patent marking not only to some but to all of the licensed transformers sold by it as required by said license agreement; defendant admits and avers that it has affixed its trademark not only to some but to all of the licensed transformers sold by it, but defendant denies that said license agreement requires it to affix to such licensed transformers any trade mark selected only for use in connection with the licensed transformers; defendant denies that the reports so filed were not accurate statements of the actual number of and amounts received for the licensed transformers made and sold by defendant during the periods covered by the respective reports; defendant denies that it has not paid all royalty due to plaintiff on the reported transformers; and defendant denies that large numbers of licensed transformers have been made and sold by defendant without any report having been made thereon to the plaintiff and without any royalty having been paid thereon to the plaintiff, as required by said license agreement.

7a. Further answering paragraph 7 of the complaint, as supplemented by sub-paragraph (a) of main paragraph 1 of plaintiff's said bill of particulars, defendant avers that the plaintiff is not entitled to royalties on non-patented switches and other non-patented attachments sold separately or in conjunction with transformers coming within the scope of the license agreement, and particularly not when such non-patented switches and other non-patented attachments are priced separately from the licensed transformer; and defendant further avers that the plaintiff is entitled only to a royalty based on defendant's net invoice price of such transformers as come within the scope of said license agreement, and that if any such transformers are sold with an allowance for freight or express charges or a discount for cash payment within a specified period, in determining the net invoice price thereof any such freight

[fol. 43] and express charges and cash discounts are to be deducted from the billing or invoice price thereof.

7b. Further answering paragraph 7 of the complaint, as supplemented by sub-paragraph (b) of main paragraph 1 of plaintiff's said bill of particulars, defendant admits that any transformers having a core and coils arranged as illustrated on page 9 of its catalog SM 10 are within the scope of said license agreement, that plaintiff is entitled to royalties on all such transformers manufactured and sold by the defendant since the date of said license agreement, and that if sales of any such transformers have been unreported and the defendant has failed to pay the plaintiff the royalties due thereon it has been wholly through inadvertence; and defendant further avers that if any such transformers were returned by the customer and credit for royalties paid thereon was taken by the defendant and subsequently such returned transformers were resold and were unreported and no royalty was paid to the plaintiff on the resale thereof, the plaintiff is entitled to the same, and that any failure by the defendant in such respects was due entirely to inadvertence.

8. Answering paragraph 8 of the complaint, as supplemented by main paragraphs 2 and 3 of plaintiff's said bill of particulars, defendant admits that while ostensibly and actually operating under said license agreement it has manufactured and sold modified transformers, each having a core and coils arranged as illustrated on page 1 of defendant's bulletin LT-24, upon which no royalties have been paid; defendant denies that such modified transformers are in fact the equivalent of the patented transformers disclosed and claimed in said Letters Patent No. 1,777,256, and defendant denies that such modified transformers fall within the provisions of said license agreement; defendant denies that it, while enjoying the advantages and privileges of said license, has wrongfully and deceitfully represented, directly or by implication, to any of its customers that any of said modified transformers were licensed transformers; defendant admits that it has placed on such modified transformers the said trade-mark which identifies the licensed transformers as being of the defendant's manufacture, for the purpose of showing that such modified transformers were manufactured by defendant,

and avers that it has the legal right so to do, without violating any provision of said license agreement, even if [fol. 44] the same trade-mark has been used by the defendant to identify the licensed transformers made and sold by it under said license agreement as having been made by the defendant; defendant denies that it sold such modified transformers with said trade-mark thereon as licensed transformers; and defendant denies that it otherwise constructed, packaged and, in general, dressed said modified transformers to resemble the transformers upon which royalties were paid to plaintiff under said license agreement, and defendant avers that it has the legal right so to do, if it desires, without violating any provision of said license agreement; defendant admits that it has not reported sales of such modified transformers to plaintiff and has not made payment of royalties thereon, and avers that reporting of such sales and payment of royalties thereon was not and cannot be required by the plaintiff of the defendant under said license agreement; and defendant denies that it has, by any act complained of in said paragraph 8 of the complaint, unjustly profited and enriched itself and caused loss to the plaintiff.

8a. Further answering the complaint, defendant avers that the modified transformers, mentioned in paragraph 8 of the complaint and which the plaintiff has in paragraphs 2 and 3 of its said bill of particulars identified as transformers of the type illustrated on page 1 of defendant's bulletin LT-24, differ both in construction and mode of operation in a substantial and non-infringing way from the transformers described and claimed in plaintiff's said Letters Patent No. 1,777,256, that said modified transformers in fact embody a patentably different invention and operate in a patentably different way from the transformers of said Letters Patent No. 1,777,256, and that said modified transformers are manufactured and sold by the defendant under the protection of United States Letters Patent No. 2,136,895, issued to Joseph G. Sola November 15, 1938, and by him duly assigned December 19, 1938, to the defendant, and that the same are now owned by the defendant. Profert of said assignment is hereby made. Defendant further avers that with respect to said modified



transformers, said license agreement and the plaintiff's claims thereunder, defendant has acted, and is now acting, in the utmost of good faith, and that it has refused to consider such transformers as coming within the scope of said license agreement upon the advice of its regularly [fol. 45] retained patent counsel and upon the advice of other and eminent patent counsel specially retained to advise on the matter.

9. Answering paragraph 9 of the complaint, defendant denies that the plaintiff has but recently discovered the alleged violations of the license agreement and the alleged deceitful practices of the defendant, and defendant avers that the plaintiff for a substantial period of time prior to any protest to the defendant knew of the defendant's manufacture and sale as aforesaid of said modified transformers; defendant admits that the plaintiff has protested several times to the defendant against the continuance of the acts complained of, and defendant admits that notwithstanding such protests the defendant has and now is continuing the acts complained of on advice of counsel as aforesaid, but the defendant denies that it has and now is persisting in any violation of said license agreement and in any deceptive and unjust practice with respect thereto, denies that it is causing any loss to the plaintiff, and denies that it is jeopardizing plaintiff's income from its other alleged licensees.

10. Defendant admits the allegations of paragraph 10 of the complaint, and avers that they are neither material nor relevant to any issue involved herein and, therefore, moves that they be stricken.

11. Answering paragraph 11 of the complaint, defendant admits that said license agreement provides that plaintiff, or its duly authorized agent or attorney, shall have access to the books of the defendant insofar as the same shall be pertinent to said license agreement; defendant admits that plaintiff has demanded access to such books, but denies that the plaintiff has been accorded access only to certain of the pertinent records of the defendant; and defendant denies that plaintiff's duly authorized agent has been denied access to other existing books or records of

the defendant pertinent to the subject-matter of said license agreement.

11a. Further answering the complaint, and particularly paragraphs 7, 8 and 11 thereof, defendant is willing to have the court appoint a competent certified public accountant who has never been connected in any way with either of the parties hereto to make an audit of defendant's books for the purpose of ascertaining the exact amount that may be due the plaintiff or the defendant on transformers manufactured and sold by the defendant since the date of said license agreement and admittedly coming within the scope thereof, and to pay one-half of the expense of such audit, the plaintiff to pay one-half of the expense thereof.

12. Answering paragraph 12 of the complaint, defendant denies that the plaintiff has in all respects performed all the covenants of said license agreement by it to be performed; defendant avers that the plaintiff in purporting to exercise its rights under said license agreement, particularly paragraphs 5 and 5a thereof, has on many occasions given notice of a change in the prices, terms or conditions of sale and has demanded arbitrarily that such changes become effective at once or on a date much earlier than the sixty-day period specified in said paragraph 5a; defendant also avers that the plaintiff in purporting to exercise its rights under said agreement, particularly paragraphs 5 and 5a thereof, has grouped the purchasers of the aforesaid licensed transformers into different classes and has established for such classes different prices, terms or conditions of sale, that a purchaser placed in one class by reason of increased purchases or otherwise may eventually become entitled to be placed in a more favored class, that the plaintiff repeatedly has greatly delayed acting on applications of the defendant for changes in classification of purchasers entitled thereto thereby causing loss to the defendant, and that the plaintiff has taken unwarranted and unjust advantage of the defendant by arbitrarily changing the status of a given purchaser of the licensed transformers from one class to a more favored class and soliciting and obtaining orders from such purchaser as re-classified by the plaintiff, all before giving any notice to the defend-

ant thereof and thereby depriving the defendant of the opportunity to solicit and obtain orders from such purchaser on an equal basis with the plaintiff and to the detriment of the defendant; and defendant further avers that the plaintiff has failed to keep the defendant fully advised as to any and all licenses granted by it to others under said Letters Patent No. 1,777,256, and the other Letters Patent upon which said license agreement is founded, and the terms of such other licenses, and that the plaintiff has failed to furnish to the defendant copies of all such other licenses and any and all modifications or changes therein, [fol. 47] as required in and by said license agreement, and defendant demands that the plaintiff be required to furnish to the defendant promptly true copies of all agreements with its other alleged licensees.

13. Defendant avers that by reason of the proceedings in the United States Patent Office during the prosecution of the application which resulted in said Letters Patent No. 1,777,256, and the admissions and representations made in said application in order to induce the grant of said Letters Patent, plaintiff is estopped to claim for said Letters Patent a construction, were the same otherwise possible, such as would cause said Letters Patent, or any of its claims, to cover or include defendant's aforesaid modified transformers, namely, transformers of the type illustrated on page 1 of defendant's bulletin LT-24 and which are also described and claimed in defendant's said Letters Patent No. 2,136,895.

14. Defendant further avers that the state of the art relating to transformers at the time of the making of the invention of plaintiff's said Letters Patent No. 1,777,256 was such that said invention, if any was involved, was narrow and was but a short step over what was disclosed and taught in various patents and printed publications, over what was known to and used by others in this country and over what was in public use or on sale in this country at or prior to the making of said invention, and that, therefore, none of the claims of said Letters Patent when construed with respect thereto has been infringed by the manufacture, use or sale by defendant of transformers of the type illustrated on page 1 of defendant's bulletin LT-24 and which are also described and claimed in defendant's said Letters Patent No. 2,136,895.

(a) That the patents and printed publications referred to, insofar as they have at present been ascertained, are as follows:

### United States Patents

[fol. 48]	No.	400,515	Thomson	Apr. 2, 1889
		400,972	Thomson	Apr. 9, 1889
		428,575	Stanley, Jr.	May 20, 1890
		536,608	Dickerson	Apr. 2, 1895
		654,390	Fessenden	July 24, 1900
		666,162	Thomson	Jan. 15, 1901
		738,864	Wiley	Sept. 15, 1903
		772,096	Hallberg	Oct. 11, 1904
		783,533	Moody	Feb. 28, 1905
		895,914	Troy	Aug. 11, 1908
		931,114	Conrad	Aug. 17, 1909
		931,124	Jackson	Aug. 17, 1909
		1,123,248	Conrad	Jan. 5, 1913
		1,195,632	White	Aug. 22, 1916
		1,255,549	Moore	Feb. 5, 1918
		1,298,443	Bodde	Mar. 25, 1919
		1,347,910	Peters	July 27, 1920
		1,378,151	Thordarson	May 17, 1921
		1,408,053	Wensley	Feb. 28, 1922
		1,462,346	Kline	July 17, 1923
		1,507,190	Kress	Sept. 2, 1924
		1,523,367	Petersen <i>et al.</i>	Jan. 13, 1925
		1,588,171	Chadwick	June 8, 1926
		1,600,842	Philips	Sept. 21, 1926
		1,635,064	Wagner	July 5, 1927
		1,654,097	Shackelton	Dec. 27, 1927
		1,659,548	Johannessen	Feb. 14, 1928
		1,677,000	Moore	July 10, 1928
		1,677,537	Werner	July 17, 1928
		1,679,910	Pfiffner	Aug. 14, 1928
		1,732,715	Dessauer	Oct. 22, 1929
		1,776,078	Mignot	Sept. 16, 1930
		1,786,422	Daley <i>et al.</i>	Dec. 30, 1930

### Foreign Patents

Austrian Patent No. 96,238, dated Mar. 10, 1924.

British Patent No. 210,053 of 1923 (Convention date France Jan. 22, 1923) accepted Sept. 25, 1924.



British Patent No. 251,998 of 1926 (Convention date Italy May 5, 1925) accepted May 19, 1927.

### Publications

"General Electric Review" Vol. XXVII, No. 10, Oct. 1924, pp. 682-683—article entitled "The Design of Small High-reactance Transformers" by R. H. Chadwick and D. W. Merchant, Transformer Department, Ft. Wayne Works of General Electric Company.

"General Electric Review" Vol. XX, No. 12, December, 1917, pp. 940-944—article entitled "Operation of Series Incandescent Lighting Circuits with Series Transformers" [fol. 49] by E. D. Trainer, Transformer Engineering Department, General Electric Company.

"General Electric Review" Vol. XXVI, No. 7, July 1923, pp. 477-495—article entitled "Testing Transformers for Central Stations" by A. B. Hendricks, Jr., Transformer Engineering Department, General Electric Company.

"Transactions of A.I.E.E. 1912"—Vol. 31, pages 2015 to 2023, article entitled "The Use of Reactance in Transformers" by W. S. Moody.

"The Electrician" Vol. 75 pages 745-6—August 20, 1915 article entitled "Testing Transformer for 500,000-volts."

"Electrical World," 1911, Vol. 57, pages 252-3 article entitled "A 400,000-volt Testing Transformer."

"Elektrische Bahnen u. Betriebe" Vol. 4 page 275, 1906 article by Rudolf Nagel entitled "Über eine Neuveranlagung an Hochspannungs-transformatoren der Siemens-Schuckertwerke G.m.b.H."

"The Brown Boveri Review" April 1927, Vol. 14, pages 105-109—article entitled "The New Brown Boveri Testing Transformers."

"Hawkins Electrical Guide" No. 6, page 1448 copyright 1914.

"Electricians Operating and Testing Manual" by Horst Mann and Tousley page 159 copyright 1916.

"Transformer Practice" by Taylor published 1913 page 28, page 162, page 202, page 231.

"Transformers" by Gisbert Kapp published 1896 page 176; page 193.

"Electrical World" Volume 31, page 302 published 1898 article entitled "A 100,000-volt Testing Set" by C. E. Skinner.

"Transactions of the American Institute of Electrical Engineers" 1898 Vol. 15 page 567 article by Charles F. Scott.

"Essentials of Transformer Practice" copyright 1927 by Emerson G. Reed, also pages 337 and 338.

"Transformers" by Gisbert Kapp 3rd Edition 1925—page 353.

"I. C. S. Reference Library" Vol. 46B, Sec. 33, pages 31-32, and Sec. 35, pages 31-32 copyrighted 1905 and 1908.

"Suggestions for producing high-frequency currents and some of their phenomena" by Edwin F. Northrup and Elliott Woods, Electrical Review, issue of March 19, 1904, pages 443-445 and issue of March 26, 1904, pages 469-471.

[fol. 50] (b) That the instances of prior invention, prior knowledge and use by others and prior public use and sale above referred to, insofar as they at present have been ascertained, are as follows:

France Manufacturing Company of and at Cleveland, Ohio.

Chester Thordarson of and at Chicago, Illinois.

Sun Ray Gas Corporation of and at Cleveland, Ohio.

General Electric Company of and at Schenectady, N. Y., and Ft. Wayne, Ind.

R. H. Chadwick and D. W. Merchant of and at the works of the General Electric Company, Ft. Wayne, Ind.

American Transformer Company of and at Newark, N. J.

Ajax Electrothermic Corporation of and at Trenton, N. J.

Bell Telephone Laboratories of and at New York City, N. Y.

Labadie A. Vlack of and at Cleveland, Ohio.

Louis W. Laube of and at Cleveland, Ohio.

Kastenhuber & Lehrfeld in and at New York City, N. Y.

Goldsmith Brothers Smelting and Refining Company of and at Chicago, Illinois.

Fansteel Products Company in and at Chicago, Illinois.

Griffin Wheel Company in and at Chicago, Illinois.

Grigsby Grunow Company in and at Chicago, Illinois.

Western Electric Company in and at Hawthorne, Illinois.

Standard X-Ray Company in and at Chicago, Ill.

Clair Brown Turner of and at Standard X-Ray Company, Chicago, Ill.

15. Defendant avers that it has in good faith at all times and in all respects performed all the covenants of said license agreement by it to be performed.

Wherefore, defendant prays:

- (1) That the relief sought by the plaintiff in its complaint be denied;
- (2) That the complaint herein be dismissed;
- (3) That costs be assessed against the plaintiff; and
- (4) That the court may grant such other and further relief to the defendant as shall be just.

[fol. 51]                      DEFENDANT'S COUNTERCLAIM

Further answering the complaint, and by way of counterclaim against the plaintiff, defendant alleges:

16. That plaintiff's said Letters Patent No. 1,777,256, were on or about March 23, 1936 made the basis of a suit filed by plaintiff against France Manufacturing Company in the District Court of the United States for the Northern District of Ohio, Eastern Division, Equity 5431; that on or about June 12, 1936 the defendant therein filed its motion for further and better particulars and inter alia inquired of the plaintiff which of the claims of said Letters Patent plaintiff would rely — at the trial, and that in respect to such motion and inquiry the plaintiff charged that claims 1 through 5, 7, 8, and 12 through 21 of said Letters Patent had been and were then being infringed by the defendant; that on or about August 1, 1936 the defendant therein filed its answer, and on or about March 8, 1937 filed an amendment to its answer, to the plaintiff's complaint and inter alia set up numerous prior patents, publications and instances of public use and sale in support of its contention that said Letters Patent were invalid; that thereafter and at the trial of said suit plaintiff's counsel announced that the plaintiff would rely only upon claims 8, 14 and 19 of said Letters Patent; that on or about February 17, 1938 the District Court filed its opinion holding said claims 8, 14 and 19 to be valid and infringed; that on or about April 23, 1938 the District Court entered its decree, in accordance with its aforesaid opinion, holding said claims 8, 14 and 19 to be valid and infringed; that on or about May 18, 1938

the defendant therein filed its petition for an appeal to the United States Circuit Court of Appeals for the Sixth Circuit, and also filed its assignment of errors and thereafter said appeal was duly perfected under the No. 812f; that after due proceedings were had in and before said Circuit Court of Appeals its decision was filed on or about September 18, 1939 and the decree of the District Court was affirmed, said decision being reported in 106 F. (2d) 605; that in its said decision said Circuit Court of Appeals, after reviewing the prior art of record pertaining to said claims 8, 14 and 19, found and held that the step taken by the patentees was short but that the improvement defined in said claims was of sufficient merit to measure up to the requirements of patentability; that it is clear from the statements made [fol. 52] in said decision of said Circuit Court of Appeals concerning the prior references therein considered and the improvements as defined in said claims 8, 14 and 19 that if the plaintiff had kept in issue any of the other claims of said Letters Patent theretofore charged to be infringed such other claims would have been found invalid; and that the plaintiff and its counsel therein fully appreciated the force and effect of the prior art of record therein upon such other claims and, therefore, deliberately withdrew from issue such other claims and deliberately elected not to submit any of such other claims to a formal adjudication.

17. Defendant further alleges that the plaintiff, by its aforesaid action and election in said prior suit against the France Manufacturing Company, attempted to escape a formal adjudication of any of the claims of said Letters Patent No. 1,777,256, therein charged to be infringed, excepting Nos. 8, 14 and 19, because of the effect of a finding of invalidity of such other claims upon the license agreement between the parties hereto; that the intent of the parties to and the spirit of said license agreement, particularly the provisions of paragraph 11b thereof, was and is that in any suit for infringement of said Letters Patent the plaintiff would put and keep in issue such claims of said Letters Patent as were infringed and that if any claims were held invalid the defendant herein thereupon would be relieved from including in its reports thereafter transformers shipped and acts performed, after the entry of the judgment or decree, covered only by such claims; that the plaintiff, without any justification, is attempting to col-



lect royalties and is attempting to exercise unlawfully price control over the defendant herein on transformers which, if covered at all, are covered only by claims of said Letters Patent which were charged to be infringed and were subsequently withdrawn from issue in said prior suit and which are in fact void; and the defendant avers that equity, good conscience and fair dealing require that all such other claims of said Letters Patent so charged to be infringed and withdrawn from issue in said prior suit be formally adjudicated herein to be invalid and of no further force or effect.

Wherefore, defendant and counterclaimant prays:

(a) That this court may enter a decree adjudging claims 1, 2, 3, 4, 5, 7, 12, 13, 15, 16, 17, 18, 20 and 21 of said Letters Patent No. 1,777,256 to be invalid;

[fol. 53] (b) That the plaintiff may be decreed to pay the costs of this proceeding; and

(c) That the defendant may have such other and further relief as to this court may seem just.

Sola Electric Company, by John R. Fischer. Leslie W. Fricke, Its Attorney, 1237 Monadnock Block, Chicago, Illinois.

*Duly sworn to by John R. Fischer. Jurat omitted in printing.*

Receipt of a copy of defendant's foregoing answer and counterclaim is hereby acknowledged this 9th day of July, 1940.

Sheridan, Davis & Cargill, Attorneys for Plaintiff.

[fol. 54] IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

MOTION FOR DISMISSAL OF DEFENDANT'S COUNTERCLAIM—  
Filed July 19, 1940

Now comes the plaintiff, Jefferson Electric Company, by its attorneys, and moves that the counterclaim filed by

defendant be dismissed. The grounds for the motion, briefly are as follows:

1. The complaint charges, inter alia, breach by defendant of a contract entered into between the parties on August 26, 1935, wherein plaintiff granted defendant a non-exclusive license under certain United States patents, including patent No. 1,777,256. Paragraph 5 of the complaint alleges the contract has not been canceled by either party, and paragraph 5 of Defendant's Answer to the complaint admits that the said contract has not been canceled by either party. The contract is therefore still in full force and effect and defendant is still a licensee under said patents, including patent No. 1,777,256.

2. Defendant's counterclaim seeks a judgment of this court declaring that certain claims of plaintiff's patent No. 1,777,256, but not all such claims, are invalid, notwithstanding that defendant still is a licensee under said patent and has been a licensee for approximately five years. The defendant, being admittedly a licensee under patent No. 1,777,256 is estopped to attack the validity of the patent.

3. The counterclaim does not state a cause of action.

A brief in support of this motion is being filed pursuant to Rule 7 of the Rules of the District Court of the United States for the Northern District of Illinois.

Sheridan, Davis & Cargill, Thos. H. Sheridan, Attorneys for Plaintiff.

Received a copy of the foregoing Motion for Dismissal of Defendant's Counterclaim, this 19th day of July, 1940.

Leslie W. Fricke, Attorney for Defendant.

[fol. 55] IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

AMENDMENT TO ANSWER AND COUNTERCLAIM—Filed July 29, 1940

Now comes the defendant, Sola Electric Company, and amends its answer and counterclaim filed herein July 9,

1940, under the provisions of Rule 15(a) in the following respects:

Page 16, cancel lines 16 to 22, inclusive, and substitute therefor the following:

"that had the plaintiff kept in issue any of the other claims of said Letters Patent theretofore charged to be infringed such other claims would have been found invalid in view of the prior patents, publications, knowledge, uses and sales set up and proved in said suit; and that the"

Page 17, cancel lines 25 and 26 and substitute therefor the following:

"suit and which are in fact void because of the prior patents, publications, knowledge, uses and sales set up in said suit and in paragraph 14 of defendant's answer herein; and the defendant avers that equity, good conscience, fair dealing and said license agreement require".

Sola Electric Company, by Leslie W. Fricke, Its Attorney.

Receipt of a copy of the foregoing amendment to the defendant's answer and counterclaim is hereby acknowledged this 29th day of July, 1940.

Sheridan, Davis & Cargill, Attorneys for Plaintiff.

[fol. 56] IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

MEMORANDUM—Filed August 7, 1940

I am of the opinion that plaintiff's motion to dismiss defendant's counterclaim should be sustained.

An order will be entered accordingly on August 9, 1940, at 10 o'clock A. M.

William H. Holly, Judge.

## IN THE UNITED STATES DISTRICT COURT

\* \* (Caption—1716) \* \*

DEFENDANT'S OBJECTION TO THE COURT'S RULING ON PLAINTIFF'S MOTION TO DISMISS DEFENDANT'S COUNTERCLAIM—  
Filed August 9, 1940.

Now comes the defendant in the above entitled cause, by its attorney, and simultaneously with the entry of the order sustaining plaintiff's motion to dismiss defendant's counterclaim makes known to the court, as provided in Rule 46 of the Rules of Civil Procedure, its objection to such order and the grounds therefor as follows:

Defendant urges that its counterclaim states a proper and valid cause of action and that it should not be dismissed.

Defendant contends that it is not estopped under its [fol. 57] agreement with the plaintiff of August 26, 1935, to contest the validity herein of claims 1, 2, 3, 4, 5, 7, 12, 13, 15, 16, 17, 18, 20 and 21 of plaintiff's patent No. 1,777,256, and that it has a clear right under said agreement to do so because of the circumstances and facts set forth in defendant's counterclaim.

Defendant further contends that it is not estopped under its said agreement with plaintiff of August 26, 1935, to contest the validity herein of the claims, particularly those enumerated above, of said patent No. 1,777,256, because the agreement contains price limitations which defendant contends should not be enforced with respect to transformers coming only under such claims unless this court finds such claims to be in fact valid.

Leslie W. Fricke, Attorney for Defendant.

Chicago, Illinois, August 9, 1940.

## IN THE DISTRICT COURT OF THE UNITED STATES

\* \* (Caption—1716) \* \*

## ORDER DISMISSING COUNTERCLAIM—Entered August 9, 1940

Present: Hon. William H. Holly, District Judge.

It is ordered by the Court that the Plaintiff's motion to dismiss Defendant's counterclaim be and the same is



hereby sustained and said counterclaim is hereby dismissed.

[fol. 58] IN THE UNITED STATES DISTRICT COURT

[Title omitted]

NOTICE OF APPEAL TO CIRCUIT COURT OF APPEALS UNDER RULE  
73b—Filed November 6, 1940

Notice is hereby given that Sola Electric Company, defendant above named, hereby appeals to the Circuit Court of Appeals for the Seventh Circuit from the order dismissing defendant's counterclaim entered in this action on August 9, 1940.

Leslie W. Fricke, Attorney for Appellant, 1237  
Monadnock Block, Chicago, Illinois.

November 6, 1940.

[fol. 59] IN THE UNITED STATES DISTRICT COURT

• • (Caption—1716) • •

STATEMENT OF POINTS ON APPEAL—Filed Dec. 9, 1940

1. The Court erred in dismissing defendant's counterclaim.

2. The Court erred in not denying plaintiff's motion to dismiss defendant's counterclaim.

3. The Court erred in not holding that defendant's counterclaim states a proper and valid cause of action.

Leslie W. Fricke, Attorney for Defendant-Appellant.

Receipt of a copy of the foregoing statement of points on appeal is hereby acknowledged this 9th day of December, 1940.

(Signer) Sheridan, Davis & Cargill, Attorneys for  
Plaintiff-Appellee.

[fol. 60] IN THE UNITED STATES DISTRICT COURT

\* \* (Caption—1716) \* \*

DESIGNATION OF CONTENTS OF RECORD ON APPEAL—Filed Nov.  
12, 1940

The defendant-appellant in the above action hereby designates that the record on appeal shall contain the following:

Complaint filed on or about May 28, 1940;

The license agreement between the plaintiff and the defendant dated August 26, 1935 made Exhibit A of the complaint;

Copies of U. S. patents Nos. 1,777,256 and 1,786,422, issued September 30, 1930, and December 30, 1930, respectively, upon which said license agreement of August 26, 1935, is based;

Defendant's motion for a bill of particulars under Rule 12 (e) filed on or about June 13, 1940;

Plaintiff's bill of particulars filed on or about June 18, 1940;

Defendant's answer to complaint, including its counterclaim, filed on or about July 9, 1940;

Plaintiff's motion for dismissal of defendant's counterclaim filed on or about July 19, 1940;

Defendant's amendment to answer and counterclaim filed on or about July 29, 1940;

Memorandum opinion of Judge Holly filed on or about August 6, 1940;

Defendant's objection to the court's ruling on plaintiff's motion to dismiss defendant's counterclaim filed on or about August 9, 1940;

Order entered by Judge Holly on August 9, 1940 sustaining plaintiff's motion to dismiss defendant's counterclaim and dismissing the counterclaim; and

Statement of points of error on which the appeal is taken to be filed in due course.

Leslie W. Fricke, Attorney for Defendant-Appellant.

Receipt of a copy of the foregoing Designation of Contents of Record on Appeal is hereby acknowledged this 12th day of November, 1940.

Sheridan, Davis & Cargill, Attorneys for Plaintiff-Appellee.

[fol. 61] Bond on Appeal for \$250.00 approved and filed Nov. 6, 1940, omitted in printing.

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[fols. 62-64] Clerks' Certificates to foregoing transcript omitted in printing.

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[fol. 65] Placita omitted.

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[fol. 63] IN UNITED STATES CIRCUIT COURT OF APPEALS FOR  
THE SEVENTH CIRCUIT, OCTOBER TERM AND SESSION, 1941

No. 7534

JEFFERSON ELECTRIC COMPANY, A Corporation, Plaintiff-Appellee,

vs.

SOLA ELECTRIC COMPANY, A Corporation, Defendant-Appellant

Appeal from the District Court of the United States for  
the Northern District of Illinois, Eastern Division

OPINION—Filed December 29, 1941

Before Evans, Sparks and Major, Circuit Judges

SPARKS, *Circuit Judge*. In this action appellee sued appellant to recover royalties pursuant to a contract entered into between them. The royalties related to certain electric transformers and parts manufactured and sold by appellant under the disclosures of appellee's United States patents to Daley, *et al.*, Nos. 1,777,256 and 1,786,422. They were issued respectively on September 30, 1930, and December 30, 1930, on applications respectively filed on July 16, 1928, and November 11, 1927.

The complaint involves the recovery of royalties on devices and their component parts which are admittedly covered by the claims of the patents, and other devices which are not admitted by appellant to be covered by any claims of those patents.

The contract, dated August 26, 1935, contains the following pertinent provisions:

(a) The licensee may at any time after one year terminate the agreement on thirty days' notice.

(b) If any claims of the patent under which the license is granted are held to be invalid or not infringed, the [fol. 67] licensee shall be relieved from reporting and paying upon devices covered only by such claim or claims.

(c) The prices, terms and conditions of sale of transformers manufactured by the licensee under the license shall be no more favorable to the customer than those which from time to time the Jefferson Company establishes and maintains for its own sales.

(d) The plaintiff will bring and diligently prosecute such suits for infringement of the patents under which this license is granted as may reasonably be necessary for enforcing those patents and preventing non-licensed competition.

The appeal now before us is from a ruling of the District Court striking a counterclaim filed by the defendant. This counterclaim alleged invalidity of the patents under which appellant held the license. We have heretofore overruled a petition filed by appellee to dismiss the appeal on the ground that the order was not an appealable one, but was merely an interlocutory one which neither granted, denied, nor dissolved an injunction. *Jefferson Electric Co. v. Sola Electric Co.*, 122 F. 2d 124.

As grounds for the declaratory judgment prayed in its counterclaim, appellant alleged that appellee, in March 1936, sued the France Manufacturing Company in Ohio, for infringement of patent No. 1,777,256, relying originally upon claims 1 to 5 inclusive, and 7, 8, and 12 to 21 inclusive. Subsequently, appellee announced in that case that it would rely only upon claims 8, 14 and 19 which were thereupon held valid and infringed. This ruling of the District Court was affirmed by the Circuit Court of Appeals for the Sixth Circuit. *France Mfg. Co. v. Jefferson Electric Co.*, 106 F. 2d 605. The counterclaim further alleged that, by withdrawing the claims above referred to from contest in the France case, appellee sought to escape a formal adjudication of those claims because of the effect



of a finding of invalidity of such other claims upon the license agreement; that the intent of the parties to and the spirit of the license agreement, particularly the provisions of paragraph 11(b) thereof (to which we have referred above as (d)), was and is that in any suit for infringement of the patent, the licensor would put and keep [fol. 68] in issue such claims as were infringed; that if any claims were held invalid, the appellant herein would be relieved from including in its reports thereafter, transformers shipped and acts performed, which were covered only by such invalid claims; that appellee, without any justification, was attempting to collect royalties and to exercise price control unlawfully over the appellant on transformers which, if covered at all, were covered only by claims of the letters patent which were charged to be infringed and were subsequently withdrawn from issue in the prior suit, and which were in fact void. Appellant further averred that equity, good conscience and fair dealing required that all such other claims of the patent so charged to be infringed and withdrawn from issue in the prior suit, be formally adjudicated herein to be infringed and of no further force and effect.

Appellant in stating its position, asserts that it does not seek to avoid its obligations as to units admittedly covered by the license. It insists that its own modified units are covered, if at all, only by invalid claims of the licensor's patent. Hence, it urges that it should be permitted to show such invalidity, because public policy forbids the unjust imposition of charges by a patent owner upon devices not embraced by his patent, and requires curtailment of his attempt to fix prices thereon. The answer to this objection is that the public by its Government has granted a patent to appellee upon everything which it licensed to appellant, and that grant carries with it a presumption of validity until it is overcome by the judgment of a federal court. This record discloses no attempt on the part of appellee to fix prices upon anything not covered by the patent. Hence, the situation is not amenable to anti-trust laws in the interest of public policy. Generally speaking, appellant as licensee is estopped to deny the validity of the patent under which he is licensed. This is elemental, and the citation of authorities in its support is unnecessary. This counterclaim is really an effort to override that prin-

ciple, and it is sufficient for us to say that we cannot approve the effort.

Public policy from the beginning of our Government has favored the issuance of patents, and Congress and the courts, consistent with that purpose, have protected them by legislation and judicial interpretation. It seems to us [fol. 69] that the ends have justified the means. Any departure from the well-settled principles should be addressed to Congress and not the courts.

The license before us was not entered into without thought on the part of appellant. It fully protected the licensee against any claims of the patents which might be declared invalid by judicial procedure, and it provided that the licensor should protect the licensee by instituting infringement suits against all infringers, which might be reasonably necessary for enforcing the patents and preventing non-licensed competition. It further provided that appellant might terminate its license and its obligation thereunder upon thirty days' notice. There is no provision in the license which requires the licensor to institute any action for the purpose of declaring any claim invalid. It was clearly appellant's intention to be protected by every claim in the patent. So, when appellee instituted action in the Sixth Circuit against the France Manufacturing Company, its duty was to prosecute that case for the purpose of enforcing the patents and preventing competition of France with appellant, who was not a party to the action. This it did by establishing the validity of three claims just as effectively as if it had prosecuted every claim. Appellee had a right to choose the claims for contest in that case in order to carry out its duty to appellant under the license.

Appellant, however, seems to have changed its position since it entered into the contract. It is now anxious for someone to bring a suit in order to relieve appellant from its burdens under the license and still leave it free to benefit by it. It seems to be assured of the invalidity of the other claims and of the value of its own modified unit, yet it is not willing to forfeit its rights under the license in order to put itself in a position where it may contest the validity of the patent claims. A court of equity cannot entertain such requests.

Appellant further contends that in withdrawing certain claims from the suit in the France case, appellee furnished

ample ground for permitting appellant to litigate the question of invalidity and is thereby estopped to claim an estoppel against appellant. There is no merit in this contention. Appellee had a right to withdraw any claim or claims from litigation in that case which it thought would enforce the patents and prevent non-licensed competition with appellant. The result of that litigation protected appellant in its rights under the license, and that is all appellee promised to do. The withdrawal of the claims was not an admission of invalidity and it furnished no basis for the escape of appellant from its estoppel to deny the validity which is still presumed to exist by the issuance of the patent.

Appellant further contends that the decision in the France case published to the world the invalidity of the claims which were withdrawn, and constitutes an eviction of appellant from any claim of monopoly thereafter. It further argues that that court, inferentially at least, declared those withdrawn claims invalid. There is no language in that decision which bears out this statement. True, the appellant in that case made a vigorous effort to have that court pass upon the validity of the claims withdrawn, but it expressly declined to do so.

The present case now stands in such form that the issue can be tried as to whether appellant's modified units come within the claims of the patents under which the license was granted. If they do not appellant will receive all the relief that it is entitled to. If the modified unit does fall within the claims of the licensed patent, then appellant will be bound by it until such time as it desires to waive its license, or until a court of competent jurisdiction, at the behest of a proper litigant, holds the offending claims invalid.

The District Court did not err in striking the counterclaim from the record. The order is

Affirmed.

[File endorsement omitted.]

[fols. 71-84] IN UNITED STATES CIRCUIT COURT OF APPEALS,  
SEVENTH CIRCUIT.

7534

JEFFERSON ELECTRIC COMPANY, a Corporation, Plaintiff-  
Appellee,

vs.

SOLA ELECTRIC COMPANY, a Corporation, Defendant-Appel-  
lant

Appeal from the District Court of the United States for the  
Northern District of Illinois, Eastern Division

DECREE—December 29, 1941

This cause came on to be heard on the transcript of the record from the District Court of the United States for the Northern District of Illinois, Eastern Division, and was argued by counsel.

On consideration whereof, it is ordered, adjudged and decreed by this Court that the order or decree of the said District Court in this cause appealed from be, and the same is hereby, affirmed, with costs.

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And afterwards, to-wit: On the thirteenth day of January, 1942, there was filed in the office of the Clerk of this Court, a petition for a rehearing, which said petition for a rehearing is in the words and figures following, to-wit:

Petition for rehearing covering 9 pages omitted from this print. It was denied, and nothing more by order of Feb. 7, 1942.

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[fols. 85-98] And afterwards, to-wit: On the twenty-first day of January, 1942, there was filed in the office of the Clerk of this Court, an answer to petition for a rehearing, which said answer is in the words and figures following, to-wit:

Answer to petition for rehearing omitted in printing.



[fol. 99] IN UNITED STATES CIRCUIT COURT OF APPEALS  
[Title omitted]

ORDER DENYING PETITION FOR REHEARING—Feb. 7, 1942

It is ordered by the Court that the petition for a rehearing of this cause be, and it is hereby, denied.

IN UNITED STATES COURT OF APPEALS

[Title omitted]

ORDER STAYING MANDATE—Feb. 13, 1942

On motion of counsel for appellant, it is ordered that the mandate of this Court in this cause be, and it is hereby, stayed pursuant to Rule 25 of the rules of this Court.

[fol. 100] IN UNITED STATES CIRCUIT COURT OF APPEALS  
FOR THE SEVENTH CIRCUIT

[Title omitted]

#### NOTICE

To: Thomas H. Sheridan, Esq., Field Building, Chicago, Illinois, Attorney for Plaintiff-Appellee

Please take notice that we shall today file with the Clerk of the United States Circuit Court of Appeals the accompanying praecipe for record in connection with petition to the Supreme Court for writ of certiorari.

Leslie W. Fricke, J. Bernhard Thiess, Sidney Newman, Attorneys for Defendant-Appellant.

Service of the foregoing Notice and receipt of a copy of the Praecipe for Record mentioned therein are hereby acknowledged this 13th day of February, 1942.

Thos. H. Sheridan, Attorney for Plaintiff-Appellee.

[fols. 101-102] IN UNITED STATES CIRCUIT COURT OF APPEALS  
FOR THE SEVENTH CIRCUIT

[Title omitted]

PRAECIPE FOR RECORD—Filed Feb. 14, 1942

To the Clerk of the United States Circuit Court of Appeals  
for the Seventh Circuit:

You are hereby requested to prepare a certified transcript of the record in the above entitled cause for filing in the Supreme Court of the United States in connection with a petition for writ of certiorari to be filed on behalf of Sola Electric Company, appellant in this Court, and to include in such certified transcript the following:

1. Printed transcript of record in this court.
2. Opinion filed December 29, 1941.
3. Judgment of this court pursuant to such opinion.
4. Petition for rehearing.
5. Appellee's answer to petition for rehearing.
6. Order denying petition for rehearing.
7. Order of this court stating its mandate.
8. This praecipe for record.
9. Usual certificates of the Clerk of this court.

Leslie W. Fricke, J. Bernhard Thiess, Sidney Newman,  
Attorneys for Defendant-Appellant.

Chicago, Illinois, February 13, 1942.

[File endorsement omitted.]

[fol. 103] Clerk's Certificate to foregoing transcript  
omitted in printing.

[fol. 104] SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed April 6, 1942

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Seventh Circuit is granted. Counsel are requested to discuss in their briefs and on the argument of this case (1) whether federal or state law applies, and (2) in the event that state law is held to govern, what the applicable state law is.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

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Endorsed on Cover: File No. 46,357. U. S. Circuit Court of Appeals, Seventh Circuit, Term No. 1029. Sola Electric Company, Petitioner, vs. Jefferson Electric Company. Petition for a writ of certiorari and exhibit thereto. Filed March 9, 1942. Term No. 1029 O. T. 1941.